

Two Shades of Green

Environmental Protection and Combat Training

David Rubenson, Jerry Aroesty,
Charles Thompson

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PREFACE

This report presents an annotated briefing on the effects of environmental restrictions on combat training using Fort Bragg as a case study. It is important to point out that this is a retrospective analysis describing the events leading up to the imposition of restrictions on combat training at Fort Bragg. It demonstrates the potential impact of environmental issues on combat training and outlines an Army-wide strategy for balancing training and environmental concerns. It is not intended to provide a detailed plan for Fort Bragg and it should be acknowledged that many promising approaches, including some described here, are now being implemented at Fort Bragg. It is the authors' hope that this report will accelerate the process of rethinking and reorganizing the Army's entire approach to combat training and land management. The study is part of a larger RAND project on Army environmental issues being jointly sponsored by the Deputy Assistant Secretary of the Army (Environment, Safety, and Occupational Health), office of the Assistant Secretary of the Army for Installations, Logistics, and the Environment and the Assistant Chief of Engineers. The action officers are Colonel J. Cabellon for the Army Secretariat and Colonel J. Glass of the Army Environmental Office.

The Arroyo Center

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Army Regulation 5-21 contains basic policy for the conduct of the Arroyo Center. The Army provides continuing guidance and oversight through the Arroyo Center Policy Committee (ACPC), which is co-chaired by the Vice Chief of Staff and by the Assistant Secretary for Research, Development, and Acquisition. Arroyo Center work is performed under contract MDA903-91-C-0006.

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SUMMARY

This report presents a RAND/Arroyo Center briefing on the implications of environmental restrictions for military combat training. It draws heavily on a case study of Fort Bragg, North Carolina, where the conflict between effective training and sound resource conservation practices has reached near-crisis levels. The Bragg case is unique because of both the difficulty and transparency of the issues. It serves as a valuable "bell ringer" case study to help the Army meet similar challenges at other installations that must conduct significant military missions while conserving sensitive ecosystems. The recent transformation of Fort Bragg, guided by sustained high-level command involvement, confirms the ability of bases to meet these challenges when adequate will and resources are applied. The strategic and detailed lessons learned through wide-ranging retrospective analysis can assist the Army in determining the root causes of its difficulties and in developing a strategy to meet both its training and environmental responsibilities in a balanced and proactive way.

The Army faces two contrasting types of environmental challenges. The first derives from "command and control" or rule-based legislation, generally associated with regulations implemented by the EPA and often related to environmental restoration and compliance. These laws and regulations are highly prescriptive and often entail permits, mandated protocols, regulatory inspections and monitoring, and Notices of Violation (NOVs) relating to hazardous waste, air, water, and noise pollution. The second challenge derives from the body of planning or procedural law related to conservation, preservation, and land management practice, in particular those laws that pertain to federal land. These laws have greater potential to directly influence the military mission. Their regulatory structure seems deceptively gentle, but compliance requires great judgment, knowledge, self-monitoring, and self-enforcement. They often entail a highly integrated planning process that mandates consultation and negotiation with other government agencies and the public. Also, the elusive concepts of good faith and mutual trust are essential in complying with these laws because of limitations and uncertainty in the underlying science and information base. This uncertainty is too large to permit a simple rule-based approach to planning. There are too many shades of gray (or green) and too many judgment calls for rigid cookie-cutter planning to be successful.

One root cause of the conflict between conducting realistic training and exercising responsible stewardship is the increasingly dynamic, complex, and pervasive nature of environmental regulation of federal facilities. Another is an Army culture that seems better able to respond to rule-based regulations than those that emphasize planning and negotiating. This was demonstrated at Fort Bragg, where the Army failed to grasp the elements of a suitable response to enforcement of the Endangered Species Act (ESA) by the United States Fish and Wildlife Service (FWS).

Fort Bragg is especially important because it must fulfill critical military and ecological missions. As the home of the 82nd Airborne Division and headquarters of the XVIII Airborne Corps, it has a critical role in national security. Many tenants and off-post units including the National Guard train at Fort Bragg, making it the Army's most intensively utilized facility. It is also the center of the second-largest population of Red Cockaded Woodpeckers (RCWs), a federally listed endangered species.

Because of the listing, Fort Bragg was obliged to consult with the FWS in a process mandated by Section VII of the ESA. From the vantage of hindsight, our review of the consultation reveals that key officials at Fort Bragg probably failed to comprehend its full implications. The issue was virtually relegated to a single isolated garrison directorate, and Fort Bragg was ultimately required to implement a plan for managing the RCW that was not crafted to minimize effects on military training. Data for these adverse effects on training are still preliminary, but the military mission at Fort Bragg could be degraded over time.

Some adverse impacts on training might have been avoided if Fort Bragg had proactively and early on offered a plan that protected RCWs while seeking to minimize restrictions on training. This report describes the elements of such a plan. *Our most important finding is that an innovative and better balanced plan would have required choices and decisions that could have been made only by the installation commander and other high-level Army decisionmakers.* One politically sensitive option is to reserve Fort Bragg for the XVIII Airborne Corps while sending other users to less ecologically sensitive installations. Another option—which has now been imposed on Fort Bragg—would have been to proactively end the policy of aggressively suppressing fires to facilitate timber management for generating revenue, a policy whose total costs far outweigh the benefits.

Such a plan was not formulated because Fort Bragg and the Army did not have a system in place to integrate environmental planning and

military training. The post's then small and organizationally weak environmental staff operated in relative isolation. The mission trainers were reluctant to participate actively in the consultations and seemed unwilling or unable to foresee the seriousness of the restrictions. The absence of an expert Department of the Army (DA) or Major Command (MACOM) team for participating in the planning and negotiating process, coupled with the traditions of installation local autonomy, "stovepiping," and rapid turnover of key personnel, also prevented a well-coordinated response. Finally, many difficulties could have been avoided or limited if Bragg's land-management priorities were not so heavily influenced by the tradition of managing the land for revenue generation.

Planning and land-use laws, including the ESA, already affect military training at many other installations. Fort Bragg's new approach in RCW conservation, stimulated by sustained high-level command involvement, gives hope that even difficult conflicts can be resolved with sufficient will and resources. But the ability to optimize training while protecting the environment would be better served if a systematic Army-wide approach were adopted. Although installations may vary in detail, we believe that the lessons of Fort Bragg can be generalized to form the foundation for a broad proactive Army strategy that includes:

- Recognition that the planning laws are as comprehensive as rule-based laws and require an authoritative response from the command structure;
- Integrated long-range environmental and military mission planning (to minimize impacts on training and combat readiness) performed by teams with expertise in wildlife biology, law, base operations, and military training;
- De-emphasis of land-management policies that stress revenue generation at the expense of ecosystem conservation, because such policies introduce incentives that can damage both military and environmental missions;
- Developing alternatives to the present base management approach (characterized by local autonomy, "stovepiping," and rapid staff turnover) to one better suited to resolving multi-dimensional long-term conservation issues whose scope may be regional or even national;
- Committing DA to establishing a system (comparable to one that exists for environmental restoration and compliance) for institu-

tional learning, data gathering, and assisting installations to resolve training and land-management issues;

- Using Base Realignment and Closure to adjust the basing structure of the Army to better match military missions to ecological conditions and capacity of training lands.

Additionally, we recommend that DoD begin to participate responsibly in the nation's environmental and conservation debate by documenting how environmental constraints affect its mission and by suggesting ways to more effectively balance its national security and environmental priorities.

Finally, we emphasize that the difficult goals of conducting effective training and exercising sound resource stewardship are compatible and that the Army, because it is the principal stakeholder for these twin goals, should be the lead defense agency in developing strategies and systems to reconcile them before new crises emerge.

ACKNOWLEDGMENTS

The authors would like to thank Scott Klinger of the U.S. Forest Service, who alerted us to the criticality of natural resource issues for the Army and also reviewed this document. We also thank Timothy Webb of RAND, who served as a co-reviewer and provided a number of useful comments.

We acknowledge the help of Lt. General Gary Luck, Commander of Fort Bragg; the staff of the Directorate of Engineering and Housing at Fort Bragg; and the Bragg combat trainers, who took the time to meet with us and provided a detailed review of an earlier version of this document. Their inputs made this report possible. We have also benefited from feedback from many in the Army community and elsewhere, too numerous to list, who read preliminary drafts and listened to our briefings. Although our treatment of Fort Bragg is retrospective and intended to help the Army learn from the past, we hope this report will assist Fort Bragg personnel as they continue to cope with an unusually profound public policy problem.

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GLOSSARY

ABN CORPS	Airborne Corps
ABN DIV	Airborne Division
ACPC	Arroyo Center Policy Committee
AR	Army regulation
ARNG	Army National Guard
ARTEP	Army Training and Evaluation Program
BLM	Bureau of Land Management
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERL	Construction Engineering Research Laboratory
DA	Department of the Army
DCSOPS	Deputy Chief of Staff for Operations
DEH	Director(ate) of Engineering and Housing
DERA	Defense Environmental Restoration Account
DESR	Defense Environmental Status Report
DoD	Department of Defense
DoE	Department of Energy
EDF	Environmental Defense Fund
EHSC	The Engineering and Housing Support Center
EPA	Environmental Protection Agency
ESA	Endangered Species Act
EXEVAL	External evaluation
FFRDC	Federally funded research and development center
FLD ARTY BDE	Field Artillery Brigade
FORSCOM	Forces Command
FRG	Federal Republic of Germany
FWS	Fish and Wildlife Service
GAO	General Accounting Office
INF BDE (MECH)	Infantry Brigade (Mechanized)
IRP	Installation Restoration Program
JAG	Judge Advocate General
LURS	Army's Land Use Requirements Study
MACOM	Major Command
METL	Mission Essential Task List
MOS	Military Occupational Specialty
MLRS BN	Multiple Launch Rocket System Battalion
NCARNG	North Carolina Army National Guard

NEPA	National Environmental Policy Act
NOVs	Notices of Violation
NPL	National Priority List
NTC	National Training Center
OMA	Operations and Maintenance Accounts
PEG	Program Evaluation Group
RCRA	Resource Conservation and Recovery Act
RCW	Red Cockaded Woodpecker
R&D	Research and Development
REGT ARTY	Regimental Artillery
ROTC	Reserve Officers Training Corps
RSOP	Reconnaissance, Selection, and Occupation of Positions
SARA	Superfund Amendments and Reauthorization Act
SF	Special Forces
SPECIAL OPS CMD	Special Operations Command
THAMA	U.S. Army Toxic and Hazardous Materials Agency
TRADOC	Training and Doctrine Command
USAR	United States Army Reserve
USAREUR	United States Army Europe
USMC	United States Marine Corps

1. THE ARMY AND THE ENVIRONMENT

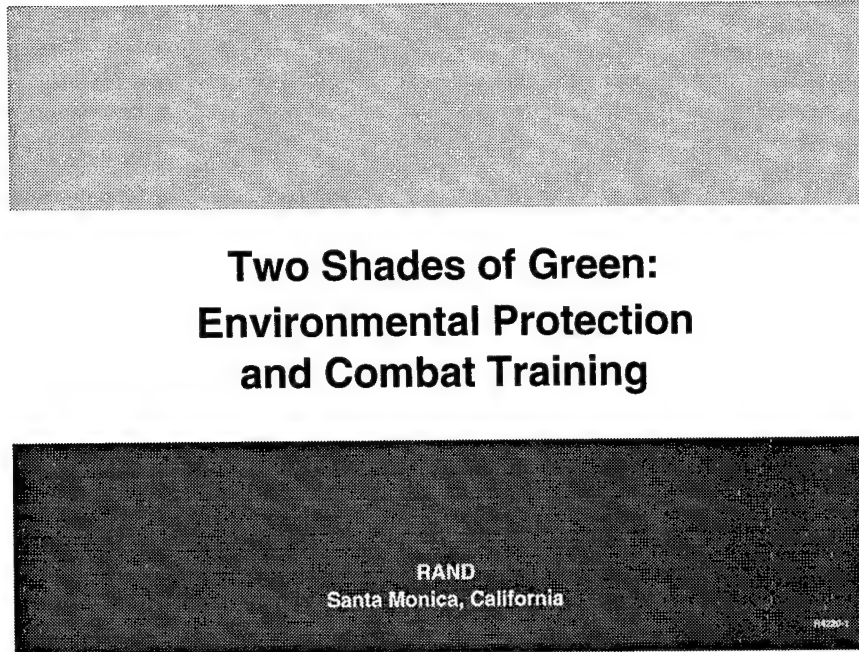


Figure 1

This report presents a strategy for helping the Army deal more efficiently and effectively with requirements for environmental protection arising from the effects of combat training. It is written in the form of an annotated briefing to allow the casual reader an opportunity to grasp its essential points.¹

¹Relevant Army policies and procedures are described in several Army regulations. Army regulation 200-2, "Environmental Effects of Army Actions," implements the National Environmental Policy Act and poses a number of these challenges: "to ensure the wise use of natural resources on Army land . . . to match military mission activities with the ecological compatibility of the land and natural resources in order to maintain resources for realistic training, while minimizing the adverse impact on the human and natural environment." The regulation mandates that decisionmakers integrate environmental considerations into the decisionmaking process and are "cognizant" of and responsible for the impact of their decisions on cultural resources: soils, forests, rangelands, water and air quality, and fish and wildlife as well as other natural resources under their stewardship.

Many of the conclusions are derived from a case study related to the Red Cockaded Woodpecker (RCW) at Fort Bragg, North Carolina. Although some matters discussed in this report are already familiar to those with detailed knowledge of events and operations at Fort Bragg, lessons from this case study could provide the basis for an Army-wide strategy. Fort Bragg simultaneously faces almost all the individual issues and problems present at other installations. The issues highlighted in this report are part of a broader set, including soil erosion and wetlands protection, that pertain to land-use management and planning at bases subject to intensive training activities. In our judgment, events at Fort Bragg clearly illustrate issues that will increasingly affect the Army's combat training mission across nearly all of its basing structure. The analysis of the Fort Bragg experience also helps identify the elements of a strategy to enable the Army to better balance the needs of military missions with those of environmental protection and resource conservation.

Outline

- ➔ • The Army and the environment
 - Environmental restrictions at Fort Bragg
 - Two installation missions
 - Evolution of the process
 - Effects on combat training
 - Conclusions
 - Looking back at Fort Bragg
 - Lessons for the Army
-

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Figure 2

The report begins with a short description of key elements of the Army's overall environmental program. This description is critical because the specific events that occurred at Fort Bragg highlight portions of the program that are only now beginning to receive attention: the environmental issues directly related to military training. The military role and environmental importance of Fort Bragg are discussed in the second section, as is the development of restrictions on training. The implications for combat training are discussed in the third section. In the last section, we argue that the lessons learned at Fort Bragg should form the basis of an Army-wide approach to efficiently balance training and environmental priorities.

A series of recent events has highlighted the need for a strategy to efficiently balance environmental concerns and combat training. Three Army civilian employees at Fort Benning, Georgia, were recently indicted for conspiring to violate the Endangered Species Act (ESA) and for making false statements during an investigation.² Environmental activists may be starting to focus on the military and the condition of

²The indictment was in the United States District Court for the Middle District of Georgia, Columbus Division, January 28, 1992.

Army lands; and many key Army installations are already engaged in difficult negotiations that could affect military training. There is a critical need to depart from the current reactive approach, which is characterized by skepticism on the part of regulators and environmentalists and fear and uncertainty on the part of the Army, to one that more efficiently balances combat training and environmental protection.

The Army Faces Contrasting Obligations

	<u>Focus</u>	<u>Disclosure</u>	<u>Enforcement</u>
Rule-based	Industrial/ facilities	Permits/ inspections	<div style="border: 1px solid black; padding: 2px; text-align: center;"> NOVs </div> Fines \$
Planning Laws	Land use planning (military training)	General reporting obligation	Self-enforcement <i>Consultations</i> Citizen suits

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Figure 3

Figure 3 shows that the Army faces two contrasting environmental challenges. In recent years, there have been significant changes in the procedures and laws related to environmental protection on federal facilities. Federal facilities are now subject to most of the same rule-based or command and control type environmental laws as the private sector.³ These laws, typically associated with the Environmental Protection Agency (EPA) and normally applying to the air, water, and chemical waste streams from facilities and industrial plants, mandate specific reporting mechanisms and inspection procedures. Permits are usually required before pollution discharges are allowed, and there are prescriptive measures for "cradle to grave" handling of many hazardous substances. The Army is becoming increasingly subject to the same sets of penalties and sanctions, associated with Notices of Violation (NOVs), as is the private sector.

³RCRA (Resource Conservation and Recovery Act), which deals with hazardous waste management, CERLA (Comprehensive Environmental Response, Compensation, and Liability Act), which deals with toxic site cleanup, and point source discharges under the Clean Air and Clean Water Acts are typical of these control-type laws.

The opening of Army installations to environmental inspectors has also increased the attention focused on another group of laws more closely related to land-use planning on federal lands. The Army is steward for 12 million acres of public lands and frequently will use private lands or other federal lands for training. Laws such as the National Environmental Policy Act (NEPA), the ESA, the National Historic Preservation Act, and the National Forest Management Act require that federal agencies perform a variety of planning activities in their management of federal lands.⁴ These may entail formal public involvement, consultations with federal and state agencies, and an informed negotiating process, in contrast to the command and control approach associated with the rule-based laws.

Unlike the rule-based laws, the planning laws are either procedural or define general goals and may entail only limited permitting and inspection activities. Federal agencies may be required to self-regulate and enforce the law in an active good faith manner. Some laws, like the ESA, carry substantive obligations. Failure to carry these out could lead to pressure from the public, active oversight by regulatory agencies, or, ultimately, a citizen suit. Although these planning laws have been in place for many decades, only recently have activists and cognizant regulatory agencies begun to pressure the Army to improve its compliance performance.⁵ NEPA plays an important integrative role in the planning process. It directs all federal agencies to identify and assess the environmental consequences of proposed activities. In the case of the Army a new test to be conducted at a test range, a new weapon system to be fielded at a training post, or a construction project to be undertaken by the Corps of Engineers would all require NEPA documentation. Ideally, the NEPA process should occur during the early planning phase of a project.

Army training installations face a more complex challenge than do many other institutions. Although industrial plants (private or public) often produce far more hazardous emissions than do training installations, Army training posts contain motor pools, arms rooms, communication shops, small industrial facilities, and landfills that

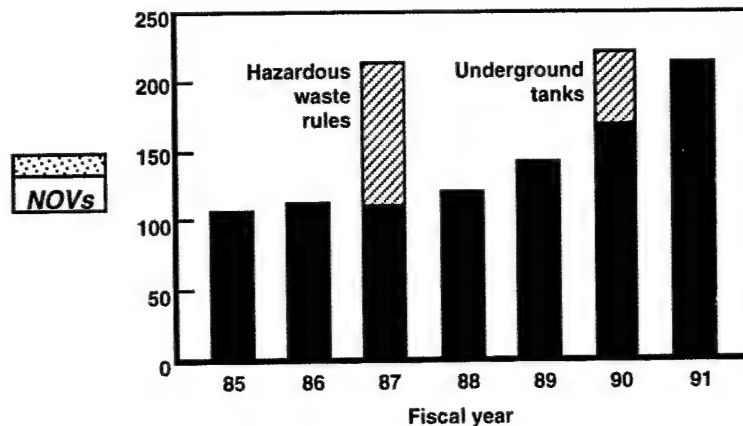
⁴Many laws have both rule-based and planning elements. The Endangered Species Act is perhaps the most difficult to categorize. It is illegal to intentionally "take" (a "take" implies destruction of an individual endangered species) a listed species, although the FWS can, under certain circumstances, grant incidental "take" permits. However, there is also a requirement for federal agencies to plan in consultation with oversight agencies. This planning process is ultimately enforceable by a citizen suit, as highlighted in Figure 3.

⁵NEPA was enacted in 1969 and ESA in 1973, although earlier counterparts were passed into law in the 1960s.

subject these installations to the inspection and enforcement protocols of rule-based laws. The Army is also an intense user of the land and therefore subject to land-use planning laws. Land-use laws have a significant impact on the Forest Service and the Bureau of Land Management (BLM), but these agencies face few industrial waste problems.⁶ The Army is perhaps unique in that it must cope with the complex task of responding to both regulatory traditions.

⁶As noted, the dichotomization is idealized for purposes of analysis. The BLM, for example, has a hazardous waste problem largely associated with the many active and abandoned mining sites on the Bureau's land. The scope of the BLM problem is still unknown as there has been little systematic attempt at surveying BLM lands. See the National Research Council, *Hazardous Materials on the Public Lands*, National Academy Press, Washington, D.C., 1992.

Enforcement Activity Is Increasing



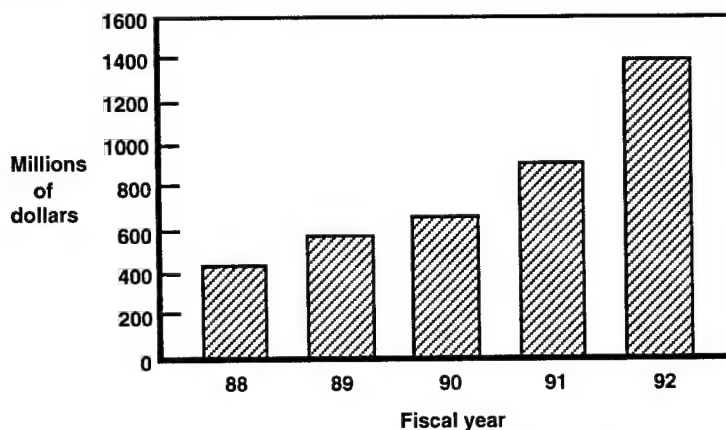
NOTE: Data was provided by the U.S. Army Corps of Engineers Toxic and Hazardous Materials Agency (THAMA). Individual installations are required to report all violations to THAMA, which then organizes and analyzes the data.

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Figure 4

Figure 4 demonstrates that the enforcement of rule-based environmental laws at Army facilities increased during the 1980s. The number of NOV's has been steadily rising, the pattern interrupted only by surges due to new requirements. In 1987, the Army experienced a large increase due to changes in hazardous waste regulations. In 1990, the mandate to remove underground storage tanks resulted in a rise in the number of violations. The general trend has been an increased number of NOV's, due mainly to increased scrutiny by federal and state regulations. We note that the data do not distinguish between administrative violations—those where minor lapses in reporting or paperwork have occurred—and those of a more substantive nature, as where a hazardous material is spilled, improperly stored or disposed of, or used inappropriately. Also, as noted earlier, NOV's are rarely, if ever, associated with failure to comply with planning laws.

Army Environmental Costs Are Growing



NOTE: Data provided by the Office of the Assistant Chief of Engineers, which monitors total OMA and DERA budgets.

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Figure 5

Prodded by the possibility of sanctions and individual liability, the Army has responded to the rise in NOV⁷s with increased funding for environmental projects.⁷ Environmental budgets now total more than \$1 billion. Some of the Army's environmental costs are covered by "fenced" accounts, i.e., from the Defense Environmental Restoration Account (DERA), and others are "buried" within the general Operations and Maintenance Accounts (OMA). Despite the diffi-

⁷In 1988, three Army civilians were convicted of violating the Resource Conservation and Recovery Act (RCRA). These criminal convictions occurred despite ambiguity at that time as to whether federal facilities could be fined for violating RCRA. According to the Fourth Circuit Court of Appeals, "The defendants first contend that they are immune from the criminal provisions of RCRA because of their status as federal employees working at a federal facility. There is, simply no merit to this suggestion," *U.S. v Dee*, 912 F.2nd 741 (Fourth Cir. 1990). Late in 1992 the Federal Facilities Compliance Act was passed into law and has eliminated any protection for federal facilities under RCRA. The impact on the Army of this law will evolve over several years, however, states will now have increased authority to fine the Army.

culty in measuring environmental costs, the Army is moving toward a complete set of accounts for monitoring aggregate environmental expenditures.

The Army's Environmental Program

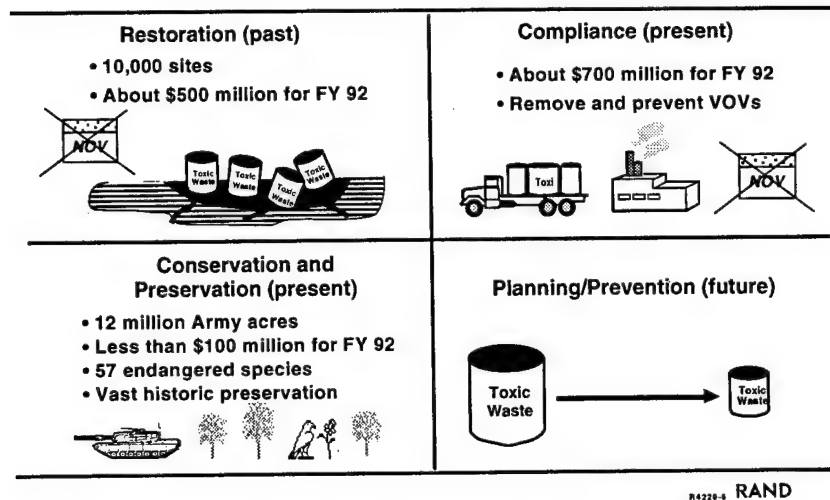


Figure 6

The resources shown in Figure 6 are divided into the four major elements of the Army's environmental program. Figure 6 shows that most resources are directed toward the two elements associated with rule-based laws. Restoration involves the cleanup of toxic waste that was improperly disposed of in the past and is budgeted at approximately \$600 million for FY 92. The Army has 30 installations⁸ on the National Priority List (NPL) of the nation's worst toxic waste sites and about 10,000 individual sites in the Department of Defense's (DoD's) Installation Restoration Program (IRP). Restoration funds are directly appropriated by Congress as part of DERA.⁹ Compliance involves correcting broad classes of problems and responding to the

⁸Testimony of Lewis D. Walker, Deputy Assistant Secretary of the Army for Environment, Safety, and Occupational Health before the Investigations and Oversight Subcommittee of the Public Works and Transportation Committee of the House of Representatives on July 28, 1992.

⁹This is the Defense Department's program for meeting the requirements of CERCLA, which is often referred to as Superfund in the private sector. Federal facilities were brought into CERCLA in 1986 when Congress passed SARA, the Superfund Amendments and Reauthorization Act. DERA also covers some non-CERCLA related restoration of hazardous waste sites. See the latest Defense Environmental Restoration Program Annual Report to Congress for further information.

NOVs shown in Figure 4 or avoiding imminent NOVs. Compliance projects are estimated to cost \$700 million in FY 92.

There has been much less emphasis on environmental issues related to the planning laws. Conservation involves managing the Army's 12 million acres. This is a small holding relative to major federal landholders such as BLM (about 270 million acres) and the Forest Service (nearly 200 million acres), but it is critical because it directly affects Army readiness and combat training. By contrast, restoration activities, and to a lesser extent compliance, are often separable from military training. Conservation is also important because Army lands have emerged as valuable ecosystems, as is evidenced by the 57 federally listed endangered species, 43 other listed threatened species, and several hundred candidate species that inhabit these lands.¹⁰ We believe that the lack of immediate and frequent regulatory inspections and sanctions, and installations' historic tradition of managing land for revenue generation, have diverted attention from this portion of the Army's environmental program. Less than \$100 million is spent annually on this function.¹¹

The fourth element of the program, planning and prevention, is not as well defined as the first three. Consistent with the emphasis on the rule-based laws, it is narrowly viewed as the steps required to avoid future NOVs. The emphasis is on pollution prevention, as described in Army regulation 200-1, "Environmental Protection and Enhancement," and its clearly defined goal is to reduce hazardous waste by 50 percent.¹² We observe that planning is not generally recognized as the essential step in complying with the laws related to natural resource conservation.

Thus the budgetary and organizational emphasis on rule-based laws results from both the desire for urgent response and a funding priority system based on NOVs. Excluding DERA, almost all environmental monies come from OMA and are allotted based on Class I, II, and III priority projects that are identified at the installations. Class I's are primarily projects needed to correct NOVs, Class II's are projects

¹⁰See Construction Engineering Research Laboratory (CERL), *Threatened and Endangered Species on U.S. Army Installations*, November 1990.

¹¹This figure was based on an informal communication from the Army Environmental Office. Since a formal accounting procedure is not in place for conservation, \$100 million is only an estimate. Other estimates are somewhat lower, but there may be some funds for compliance that also benefit conservation.

¹²HAZMIN Fact Sheet, Toxic and Hazardous Materials Agency.

that will lead to NOV's if not funded, and Class III's are for other environmental projects.¹³

This priority mechanism tends to orient the system away from the bottom two elements shown in Figure 6. Since the planning laws generally do not lead to NOV's, it is harder to justify funding based on Class I or II priorities.¹⁴ But installation environmental coordinators are learning to package conservation projects within this scheme, and part of the \$100 million shown in Figure 6 probably overlaps the \$590 million included under compliance. However, it is occasionally difficult to designate these projects as Class I, and it may even require stretching the definitions of Class II. As a result, requests for Class II conservation projects are often denied by higher-level headquarters.¹⁵

¹³See *Army BasOps Primer*, Directorate of Management, Department of the Army, March 1992, for a more formal and complete description of Class I, II, and III projects.

¹⁴However, a jeopardy opinion by the Fish and Wildlife Service (FWS) under the Endangered Species Act that threatens to restrict mission activities unless certain actions are taken could be Class I.

¹⁵As an example, Fort Carson received \$1.783 million for Class I projects in FY 92. \$0.150 million was for the integrated Training Area Management program, which is clearly a conservation project; the rest was for projects related to the rule-based laws (compliance). Also, \$2.38 million was requested for Class II projects, and only \$0.5 million was allotted. Of this money, \$0.2 million was for projects relevant to conservation. Of the \$1.880 million in Class II requests not granted, \$1.72 million was for projects related to conservation. (Based on an internal briefing to the Program Budget Advisory Committee at Fort Carson.)

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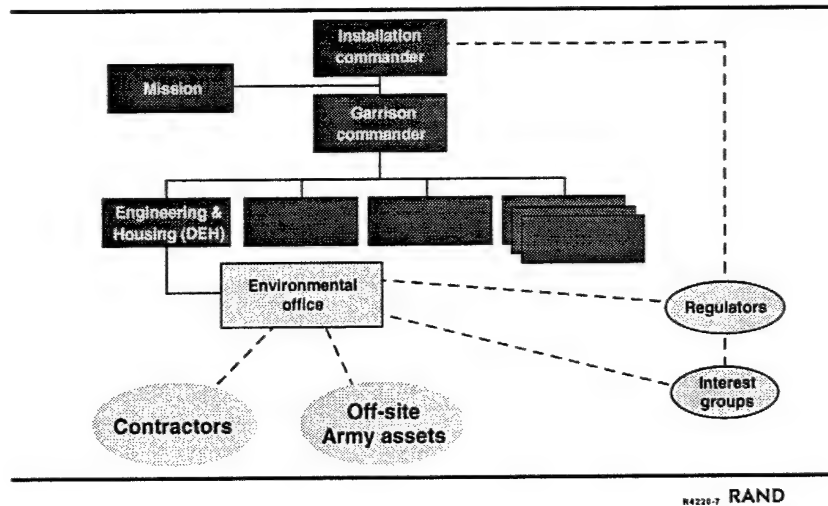


Figure 7

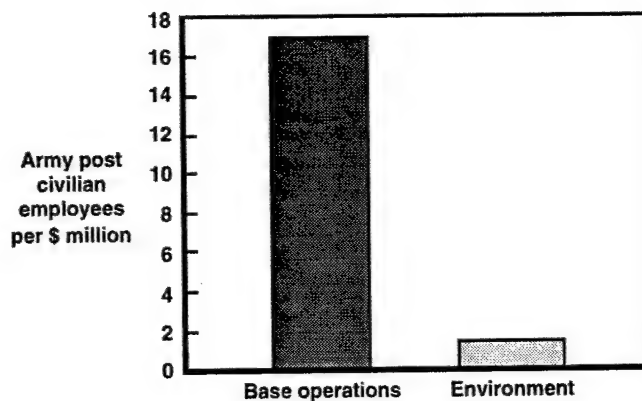
Figure 6 demonstrates that the Army has emphasized rule-based or command and control-type regulations in its response to growing external demands for environmental protection. An Army installation organization chart is shown in Figure 7 and indicates how this response has been accomplished with minimal impact on the culture and structure of the Army.

The installation commander, typically a general officer, has two main responsibilities: to direct the military mission and to manage the garrison. Most of the latter duties are delegated to the garrison commander, typically a well-seasoned full colonel. Environmental affairs are usually coordinated within a small environmental office composed of Army civilians who are part of the Directorate of Engineering and Housing (or Directorate of Public Works), an institution generally led by an officer who is often from the engineer branch.¹⁶

¹⁶Recently, Fort Carson adopted a structure with the environmental coordinator responding directly to the garrison commander. There may be other exceptions, such as Aberdeen Proving Ground, to the pattern shown in Figure 7.

Despite the explosive financial growth in the Army's environmental program, the major tangible effect on Army installations has been the increased complexity faced by the civilian-dominated environmental office. This office now deals with an increasingly intricate network of laws and external entities. These entities include off-site Army offices established to support installation compliance with rule-based laws but who also have a role of gathering and analyzing data from the installation's environmental offices. The installation's environmental office must also manage contractors who implement most of the environmental work, and deal with regulators and interest groups. The office also confronts a significant challenge in dealing with internal installation officials, including some who may not recognize the importance of environmental concerns or may even view them as a diversion from or impediment to the success of their mission. Oddly enough, support for environmental matters is sometimes found at the highest levels of the organization. The potential for liability, and the fact that he is personally notified by regulators of potential violations (illustrated by the dashed line shown in Figure 7), often draws the commander actively into the process. At other organizational levels, environmental protection and conservation may be viewed as irrelevant, as a drain on base resources, and as sources of conflict with mission excellence.

Environmental Personnel



R4220-88 RAND

Figure 8

The two shades of green in Figure 7 imply an environmental office that is largely separated from the operation of the base. This impression is reinforced in Figure 8. Despite the tremendous financial growth, installation environmental offices are relatively small. For each million dollars spent on general base operations, there are approximately 16 employees.¹⁷ In contrast, there are only about one or two employees per million dollars devoted to environmental activities. The bulk of environmental resources are channeled to off-site contractors or off-site Army offices.

Both internal and external factors explain the disparity shown in Figure 8. Environmental staffs were quite small when the Army's

¹⁷The STRAP (an informal report published as a result of a 1990 meeting of Army environmental personnel) reports 570 environmental personnel on installations. The Base-OPS Program Evaluation Group (PEG) shows 428 in 1991 and 1,710 in 1992. The ratios in Figure 8 are based on the 1992 PEG data. There has been some growth in environmental staffs but clearly not a quadrupling in a single year. Growth may be due to recoding of personnel from engineering to environmental functions, although the 1,710 may include employees at command headquarters. The Army has approximately 1,400 real estate properties and 160 installations with garrison staffs. Either extreme represents a small environmental work force.

program began to expand, and it was obviously difficult to build large staffs quickly. The environmental program has also been growing at a time when the overall Army tendency is to civilianize, centralize, and contract-out base operations. This has recently been exacerbated by an overall downsizing trend, including base operations, that makes it difficult to build environmental staffs while the overall installation work force is being reduced.

The disparity also prompted the emphasis on responding to rule-based laws and regulations. Issues that can result in NOV's are often suited to being addressed on a contract-out basis,¹⁸ although a thorough analysis of the use of base personnel in meeting rule-based law requirements and in achieving pollution prevention has not yet been conducted. Thus a synergism exists between the Army's reliance on external contractors to perform base operations tasks and the numerical growth in NOV's. Given these trends and the various pressures to respond quickly to NOV's, there has been little emphasis on building internal capabilities. Thus, environmental offices have evolved into "money rich, people poor" operations that sometimes serve as conduits for Army environmental funds.

There are other systemic barriers to building environmental staffs. Turnover of civilian Army environmental professionals is a continuing problem. This is in part due to the relatively low GS (General Services) levels (or equivalent) assigned to work tasks that entail considerable stress, expertise, and responsibility.¹⁹ Also, the cultural gaps implied by Figure 7 have led to situations where qualified Army civilians believed their work was not adequately appreciated. Within the Army civilian work force, policy conflicts between supporters of conservation and timber management for revenue generation have discouraged wildlife biologists.

This latter point is accentuated by an external labor market that may offer more and better opportunities for environmental personnel. It is also extremely difficult for the Army to hire civilians with appropriate training. Educational institutions have not fully responded to the ed-

¹⁸Installation "Schedule X" documents (personnel requirements reports) have generally shown that there are insufficient personnel for all environmental functions.

¹⁹According to AR 690-950, installation environmental coordinators will typically fall into the GS-12 or -13 category. However, the *U.S. Army Environmental Professional Career Field Data Base*, United States Army Toxic and Hazardous Materials Agency, January 1991, reports only 8 GS-12s in FORSCOM (Forces Command) and no GS-13s or 14s. This source reports 5 GS-12s in TRADOC (Training and Doctrine Command) and 1 GS-13. We are aware of improvement in these figures, but they still point to a low status work force with tremendous responsibility.

educational needs of either professional or technician-level environmental personnel, and most training, until recently, has been on the job.

These latter problems are likely to remain as long as the Army views itself as simply a customer in the market for civilian environmental and natural resource personnel. Young professionals will continue to take advantage of the significant responsibilities associated with base environmental work and then leave for higher paying positions. Although higher job classifications and greater appreciation of work are likely to improve this picture, building effective environmental teams is likely to be an enduring challenge. This will be particularly true as the economy improves and national policy stimulates further growth of environmental protection career options in industry and government.

The Army's Response to Contrasting Obligations

Rule-based	<ul style="list-style-type: none"> • Funding (> \$1 billion), NOV emphasis • Adopted Base-Ops trends <ul style="list-style-type: none"> – Civilianize – Centralize – Contract out
Planning Laws	<ul style="list-style-type: none"> • Army post environmental offices <ul style="list-style-type: none"> – Small and isolated – Cope with complex forces – Little ability to resolve conflicts with military mission • Special strategy needed?

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Figure 9

Figure 9 summarizes the Army's response to the two types of environmental challenges portrayed in Figure 3. To date, the Army has responded to the urgent legal requirements imposed by the rule-based laws by developing a system to facilitate funding for NOV-related projects.²⁰ This response has been consistent with the overall trend to centralize, civilianize, and contract-out base operations.

The approach raises several obvious questions about the ability to implement planning laws. Small, isolated environmental offices with little authority are not sufficiently empowered within the base structure to develop plans that could affect the overall operations at the installation. There are few internal capabilities for performing comprehensive planning, and there is limited emphasis on the process. The environmental office has no authority to offer compromise proposals as part of the planning, consulting, and negotiating process, even if those proposals might allow greater flexibility in the long run for military training at the post. Thus, the importance of the planning laws and the appropriate Army strategy for dealing with them

²⁰As discussed in Figure 6.

need to be considered. As remarked earlier, the rule-based laws have a classic "command and control" flavor while the planning laws involve planning, self-regulation, and informed negotiations with regulators. The need to deal with both types of law is in many ways a unique challenge for the Army.

2. ENVIRONMENTAL RESTRICTIONS AT FORT BRAGG: TWO INSTALLATION MISSIONS

Outline

- The Army and the environment
 - Environmental restrictions at Fort Bragg
 - ➔ – Two installation missions
 - Evolution of the process
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 - Conclusions
 - Looking back at Fort Bragg
 - Lessons for the Army
-

R4220-4# RAND

Figure 10

The next portion of the report addresses the unique combat training and environmental requirements at Fort Bragg. The dilemma at Fort Bragg is probably more severe than that at virtually any other installation. Nevertheless, it exemplifies the mechanisms by which planning laws are enforced and their capacity to affect the military mission. It also illustrates the inadequacy of the Army's current response to the planning laws and the need for an improved, more comprehensive strategy. The analysis of Fort Bragg also reveals elements of this strategy, which are discussed in the last section of this report.

Fort Bragg's Mission



- About 150,000 acres
- Headquarters XVIII Airborne Corps
 - 82nd Airborne resident
 - Ready to deploy in 18 hours
- Army's heaviest training density
 - National Guard, Marines, ROTC
 - Special Forces
 - XVIII Airborne exercises
 - 141,000 acres below ARTEP

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Figure 11

By any measure, Fort Bragg is an enormous Army installation. With its sub-installations it comprises nearly 150,000 acres and has a day-time employment of almost 50,000. It serves as headquarters for the XVIII Airborne Corps and as residence for the 82nd Airborne Division. Because troops of the XVIII Corps can be the first Army units to be deployed, activities at Fort Bragg play a critical role in national security policy.

In addition, Fort Bragg is the setting for numerous exercises. National Guard units train 52 weekends per year and through most of the summer. The General Accounting Office (GAO) described Fort Bragg as having the Army's heaviest training density. This implies that Fort Bragg's true maneuver area is considerably smaller than the area identified in the Army's Land Use Requirements Study (LURS) for the Army Training and Evaluation Program (ARTEP).¹ In addition, some units returning from Europe are being based at Bragg.

¹See Training Circular TC-25-1 (Training Land) for a recent (September 1991) discussion of Army Training Land requirements, including environmental considerations.

Fort Bragg's Environmental Mission

- One of the largest pieces of old-growth longleaf pine ecosystem
 - Two federally listed endangered plants
 - Surveys ongoing
 - 200 rare plant species
 - 90% of the world's pixie moss
 - 423 (260 active) Red Cockaded Woodpecker colonies
 - Listed in 1970
 - Center of second-largest population (about 370 active)
-

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Figure 12

While Figure 11 portrays a base that is strained to its training capacity limits, Figure 12 indicates that the base is also part of a sensitive and unique ecosystem. Surrounded by an area of multiple land use, including logging, Fort Bragg retains one of the nation's largest contiguous parcels of old-growth longleaf pine ecosystem. This is a fragile ecosystem, susceptible to erosion and maintained by frequent naturally occurring forest fires. Erosion is particularly severe when vegetative cover is removed.

The marker of the health of this ecosystem is the Red Cockaded Woodpecker (RCW), a federally listed endangered species. With 260 of the 370 active colonies located in the entire North Carolina Sand Hills habitat, Fort Bragg is essential for preserving this species.² The fragility of the regional pine ecosystem is also indicated by a

²An RCW clan (about three to five birds) will inhabit a group of trees known as a colony. A cavity tree is a tree in which an RCW has created a cavity. These trees are typically within 1,500 feet of each other. See R. McFarlane, *A Stillness in the Pines*, W. W. Norton & Company, New York and London, 1992, for a detailed description of RCW habitats and ecosystems.

previously employed marker, the Ivory Billed Woodpecker, which has not been observed in the United States since the late 1970s.

As part of an ecosystem, Fort Bragg also contains other natural and biological resources. It houses two federally listed endangered plants and a variety of other unique plants. One Fort Bragg natural resource worker suggested that the diversity of plant species at Fort Bragg was as high as anywhere in North America. In addition, Fort Bragg contains wetlands and an unknown quantity of archaeological sites.

A complicating factor at Fort Bragg has been the tradition of using the land for revenue generation. Timber harvesting and traditional forestry practices gave rise to a policy of aggressive fire suppression. This policy was in direct contrast to the natural processes that maintain the ecosystem. It also made the post an inhospitable site for Army wildlife biologists concerned about compliance with the ESA.

“A Most Unremarkable Bird”



- Requires old living pines
 - Nests in 70+ yr. trees
 - Forages in 30+ yr. trees
- Once inhabited much of the southeast
- Requires fire-based ecosystem
- Loves the Army
 - Forts Bragg, Benning, Polk, Stewart

04220-13 RAND

Figure 13

As shown in Figure 13, the RCW is a small bird that creates cavities in mature pine trees. Since logging and development have virtually eliminated older pines on private land, the RCW is largely confined to federal land. Although Bragg has the Army's largest habitat, major RCW populations are present at Fort Benning, Fort Stewart, and Fort Polk. Also noted in Figure 13 is the fire-based ecosystem required to maintain the species. Undergrowth blocks flight paths to nesting cavities and promotes RCW predators such as rat snakes and flying squirrels. Fire clears the undergrowth and is a critical factor in maintaining a suitable ecosystem. This figure also illustrates vehicle tracks near cavity trees. Such tracks can produce severe erosion and damage to cavity tree root structure.

Wildlife biologists, including those at Bragg and other Army installations, are currently adopting strategies for maximizing the growth of existing colonies, provisioning inactive sites to encourage reactivation, protecting against predators, translocating juvenile birds to unoccupied colony trees, and assisting in pair bonding. These strategies show considerable early promise but are highly labor intensive. Proper mid- and understory control is also essential for maintenance and recovery. Nevertheless, it is too early to tell

whether these approaches will actually facilitate long-term RCW recovery.³ If these technical approaches continue to show promise, installations are likely to propose them in their RCW management plans.

³See DoD Proceedings, *RCW Management Workshop*, 3-5 April 1991, at the Marine Corps' base at Camp LeJeune; see also a series of papers published by staff at the Department of Zoology, North Carolina State University. See for example, "Carter, J. H. III, et al., *Restrictions for RCW Cavities*, Wildlife Soc. Bull. 17:68-72, 1989, or Doerr, P. D., et al., *Reoccupation of Abandoned Clusters of Cavity Trees (Colonies) by RCW*, Proc. Annu. Conf. Southeast Assoc. Fish & Wildlife Agencies, 43:326-336. Professor Doerr's findings, based on research that is still continuing in the Sandhills region, are particularly encouraging.

Fighting Position Near Cavity Tree



Figure 14a

Military training can degrade the condition of the ecosystem in several ways, as illustrated in Figures 14a, 14b, and 14c. Figure 14a shows an area where troops created a fighting position near an RCW cavity tree (marked by two light gray bands). Such positions can result in erosion and damage to cavity trees. Training-related damage, including erosion, can stem from vehicle use and the direct impact of vehicles or ammunition on trees. An example of an eroded area is shown in Figure 14b. Figure 14c shows a defensive ditch in a dense pine area.

Erosion Damage

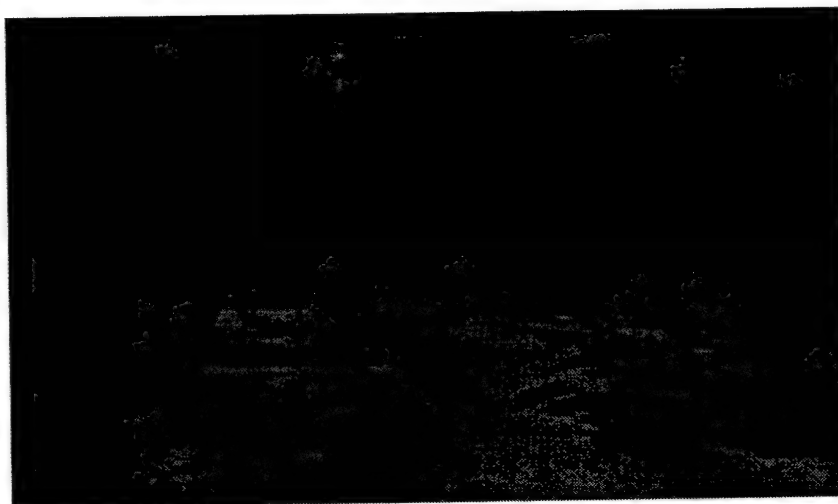


Figure 14b

Defensive Position Near Pine Trees



Figure 14c

Land Management-Related Damage

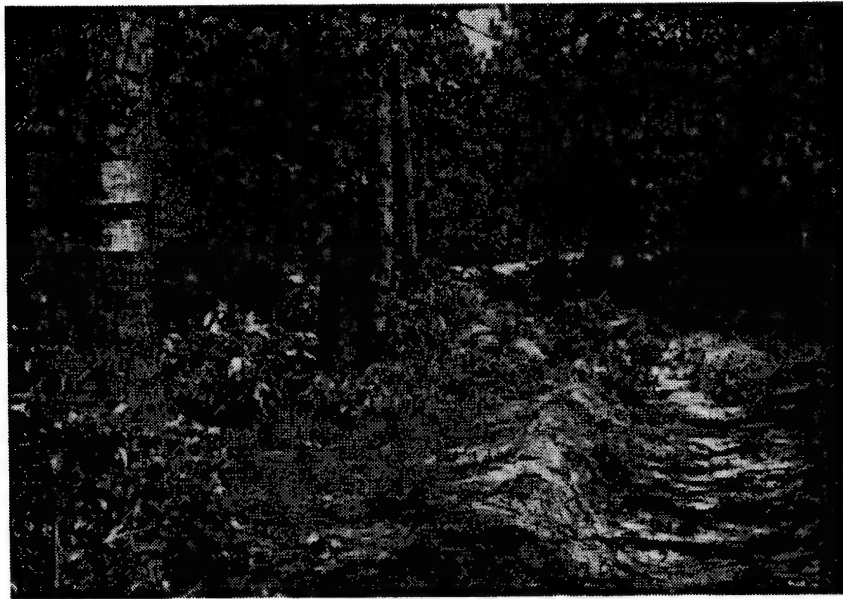


Figure 15

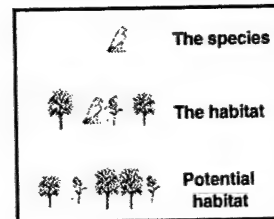
The land-management policy emphasizing aggressive fire suppression can result in construction of extensive fire lanes that damage habitats. In Figure 15, a fire plow line near an RCW cavity tree (marked by two light gray bands) shows evidence of erosion, which can indirectly damage the pine trees. Fire suppression also damages habitats by promoting understory growth (as was discussed in Figure 13 and illustrated in Figure 15). Pine trees are relatively fire resistant and will be dominant if the naturally occurring forest fire-related processes are permitted to occur.

The Endangered Species Act

Protected on private lands



Protected on federal lands



- Section IX—no taking of listed species

- Section VII—Federal responsibility

- Initiate consultation with FWS
- Prepare Biological Assessment
- Implement Biological Opinion

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Figure 16

The damage illustrated in Figures 14 and 15 is important because it is typical of incidents that occurred throughout the 1980s. These incidents are also counter to the protection the RCW receives as an endangered species listed under the Endangered Species Act (ESA), especially the two sections of the Act illustrated in Figure 16. Section IX of the Act prohibits the “taking” of species and imposes civil or criminal penalties for such acts. Section IX would probably best be described as a rule-based law within the terminology used in Figure 3. Its provisions are specific and unambiguous, despite the lack of permitting or formal inspection procedures.

Although Section VII of the Act has clear-cut goals, its application is similar to that of the planning laws discussed in Figure 3. It imposes additional obligations on federal agencies to actively promote the conservation and recovery of the species and to seek informal and formal consultation with the Fish and Wildlife Service (FWS) when an agency believes its actions may affect the existence of the species.⁴

⁴See J. C. Kilbourne, “The Endangered Species Act,” *Environmental Law*, Vol. 21:499, pp. 500–585, for a detailed discussion of Section VII obligations. Existence of the species requires assurance of genetic viability and appropriate habitat management.

The agency then prepares a Biological Assessment, which may lead to a formal consultation if there is a "may affect" determination.⁵ The FWS then formulates a Biological Opinion with recommended actions. Although the ESA does not explicitly provide additional protection to endangered species on federal lands, the consultative process facilitates earlier consideration and action, possibly leading to greater protection for existing and potential habitat.⁶ Section VII also requires that federal agencies carry out programs for the "conservation of endangered and threatened species." As is typical of the planning laws, specific Section VII restrictions result from a negotiating process. If a "jeopardy" opinion is promulgated by FWS, a project could be aborted or severely restricted. However, the goal of the Section VII consultation is to arrive at "reasonable and prudent" alternatives even with a jeopardy opinion.⁷ Jeopardy opinions do not necessarily doom a proposed project to failure.

⁵Detailed regulations concerning the consultation process can be found in The Federal Register, Vol. 51, No. 106, Tuesday, June 3, 1986, pp. 19940-19956.

⁶If federal land is designated as critical habitat then it could be brought into the Section VII process even if the species is not present on that land. Private developers can be directly brought into the Section VII process if they require a federal permit, in which case the permitting agency may be required to initiate Section VII consultation.

⁷A recent report by the World Wildlife Federation, based on data from FWS, summarizes five years (1987-1991) of Section VII consultations. During this period, there were 71,500 informal ESA-related consultations with FWS and 2,000 formal consultations. These 2,000 formal consultations yielded 350 jeopardy opinions (with "reasonable and prudent" alternatives identified), of which 130 were of a type applicable to ESA/land-use conflicts. Only 18 of the jeopardy opinions resulted in aborted projects. Thus, even a land-use project that received a jeopardy opinion from FWS is very likely to go forward, perhaps with modification, with a probability greater than 85 percent.

3. ENVIRONMENTAL RESTRICTIONS AT FORT BRAGG: EVOLUTION OF THE PROCESS

Outline

- The Army and the environment
 - Environmental restrictions at Fort Bragg
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 - Looking back at Fort Bragg
 - Lessons for the Army
-

PA220-44 RAND

Figure 17

The consultative process between FWS and Fort Bragg is reviewed in Figure 17 and the next few figures. We will advance the hypothesis that the organizational structure shown in Figures 7 through 9 contributed to the failure to arrive at an optimal Army strategy for protecting the RCW while minimizing the effects on the military mission. This reflects an overall program that has not yet come to terms with the pervasive nature of the planning laws. It may also reflect the Army's natural propensity for dealing with command and control or rule-based regulations, as opposed to those that are heavily dependent on self enforcement, consultation, and expert good faith negotiations.

The Consultation Process

- **Fort Bragg knew the effects of combat training early**
 - 1980, '84, '85 consultations on garrison issues
 - "Section IX type" violations
 - Steady increase in Fort Bragg training density
 - **The Army did not seek consultation on combat training**
 - **Negotiations were left to the DEH**
 - Little authority
 - Few inputs from combat mission
 - Little experience compared to EDF scientists
-

NOTE: DEH = Director(ate) of Engineering and Housing;
EDF = Environmental Defense Fund

R4220-89 RAND

Figure 18

Fort Bragg knew (or should have known) shortly after the RCW was first listed as an endangered species in 1968 that military training and a forest management policy based on fire suppression was affecting the viability of the RCW.¹ Incidents like those illustrated in Figures 14 and 15 were not uncommon and may have constituted Section IX violations of the ESA. An RCW management plan was proposed for Bragg in the mid-1970s but was rejected within the DEH because it conflicted with timber management goals. Nearby, Camp Le Jeune sought consultation on military training with the FWS in 1979, and Fort Polk did the same in 1980.² There was an Army-wide consultation on forest practices in 1984 that led to a series of Army guidelines for the RCW. One expert on the Bragg region informed us that he had advised Fort Bragg many times of the damaging effects of military training. Fort Bragg itself sought consultation over garrison

¹However, Fort Bragg's obligations became more serious with the 1973 amendments to the ESA.

²Fort Polk received a non-jeopardy opinion from the FWS on the effect of military training in 1980. The opinion was documented in a letter to General Palustra.

and construction issues, but not on overall military training. Based on these events, it appears that Fort Bragg should have sought consultation with the FWS on the overall effect of military training many years before the process actually began in 1988.

When the formal consultation with FWS finally occurred, the environmental office or the DEH appeared to negotiate on behalf of the entire base. As implied in Figure 7, the DEH generally has little authority (and expertise) to negotiate on a broad variety of issues. Our distinct impression is that personnel responsible for the Bragg combat mission were unaware of the possible effects of the consultation. There was also little evidence of a systematic Army approach to coping with planning issues related to natural and biological resources. The DEH was relatively inexperienced compared to the FWS and the Environmental Defense Fund (EDF). The tradition of installation local autonomy ultimately weakened effective coordination between Fort Bragg, Forces Command, and the Department of the Army. As a result, Fort Bragg found itself dealing with issues that were not only unfamiliar to much of its staff but required a coordinated green suit-civilian response. "Stovepiping" and rapid turnover of key military and civilian personnel exacerbated the situation by impairing the base's ability to maintain staff continuity and expertise.

History of the Consultation

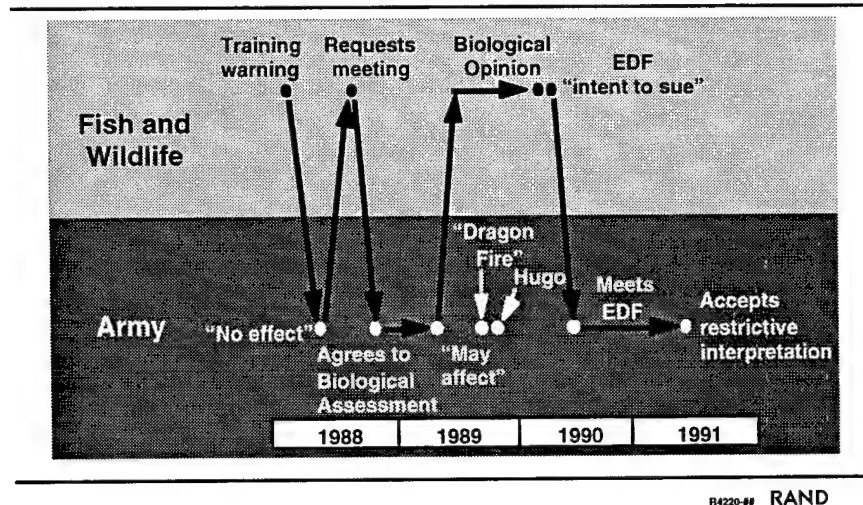


Figure 19

Figure 19 reviews the history of the consultation.³ As already shown in Figure 18, Fort Bragg did not promptly seek consultation with the FWS on overall military training. In May 1988, the FWS notified Fort Bragg that military training may be affecting the species. Bragg officials responded with a "no effect" decision. According to one source, Fort Bragg was ordered by higher headquarters to cooperate when the FWS again insisted that a consultation begin.⁴ The first step is for the action agency (in this case, the Army) to conduct a study called a Biological Assessment, which determines whether or not agency activities may be affecting the existence of the species. The Assessment was completed in early 1989 and reached the "may affect" conclusion. However the Assessment also challenged the FWS

³Both Figure 19 and this summary are based largely on the Biological Opinion of the FWS, supplemented by interviews.

⁴John Beasley, "The Army and the Red Cockaded Woodpecker: Managing an Endangered Species," a thesis submitted to the faculty of the National Law Center of George Washington University, September 30, 1991, p. 93. This source reports a number of incidents that led to deterioration of the relationship between Fort Bragg and the FWS, including range targets that were superimposed on pictures of RCWs, pp. 89-90.

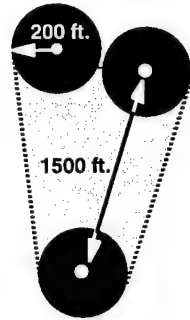
by stating that the effect on the RCW could not be allowed to affect the military mission.

Having received a "May Affect" Assessment, the FWS began a more detailed study called a Biological Opinion. The Biological Opinion is a plan to protect the endangered species and is usually developed jointly by the FWS and the action agency. From the information shown in Figure 18 and our site visit and subsequent discussions, it appears that Fort Bragg negotiators within the DEH had insufficient authority to enter into good faith negotiations. Although they had an opportunity to comment, the combat trainers performed as if they were unaware of the sensitivity of the consultation process, and they failed to prevent incidental Section IX type violations. During preparation of the Opinion, the massive "Dragon Fire" training exercise consisting of 15 to 17 artillery battalions also took place. The exercise led to extensive habitat damage, which may have further weakened Bragg's credibility with the FWS and activists. Compounding the Army's dilemma, Hurricane Hugo destroyed what was at that time the largest population of RCWs (in South Carolina's Francis Marion National Forest), making Fort Bragg's colonies even more critical. All of these factors undoubtedly affected the tone and content of the Biological Opinion.

The Environmental Defense Fund, a citizens' group concerned with environmental affairs, timed a formal notification of intention to sue the Army with the release of the Biological Opinion. This jarred Fort Bragg into a sudden awareness of the seriousness of the issue, and the EDF was invited to the base. According to several sources, base officials were poorly prepared for the encounter and damaged Bragg's credibility by making insupportable claims about the feasibility of increasing the RCW population.

The immediate impact of the Opinion was delayed by Desert Storm/Shield, but the return of the troops was quickly accompanied by a growing recognition of the training implications. During our site visit, we found that the mission staff believes that Bragg's mission interests were inadequately represented during the negotiations. They also seemed unenthusiastic about meaningful participation in the negotiating process. We are led to conclude that there was a lack of proper coordination between mission and garrison staff, and that Army negotiators had insufficient authority to anticipate and prevent activities harmful to RCW habitat.

Key Provisions of the Opinion



- Allowable traffic
 - Transient foot
 - Vehicles on roads
- No fixed emplacements
- Maintain forage habitat
(Limits damage to pine trees anywhere)
- Midstory reduction
(3-year burn cycle)

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Figure 20

Figure 20 illustrates the key provisions of the Biological Opinion. Cavity trees are marked with double red or white bands and signs. All trees within 200 feet are marked by single red or white bands. Three to five cavity trees within 1,500 feet typically make up a colony, and the restrictions apply throughout the colony, as shown in pink and red in Figure 20. In those zones, transient foot traffic and vehicular traffic on existing roads are the only permitted activities. This traffic restriction was imposed to maintain adequate foraging habitat. It severely restricted allowable damage to pine trees anywhere on post. The base is also obliged to institute a three-year burn cycle to clear away hardwoods and midstory vegetation.

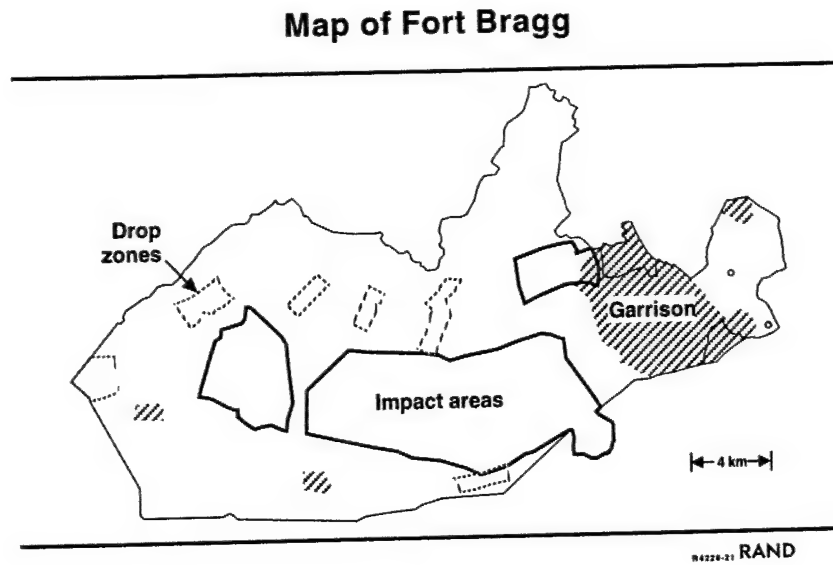


Figure 21

Figure 21 shows a map of Fort Bragg. It identifies the garrison area, drop zones, impact areas, and areas not available for military training. Much of the remaining area is available for maneuver operations, but the northern panhandle is too densely forested for significant maneuvers.

RCW Restricted Zones

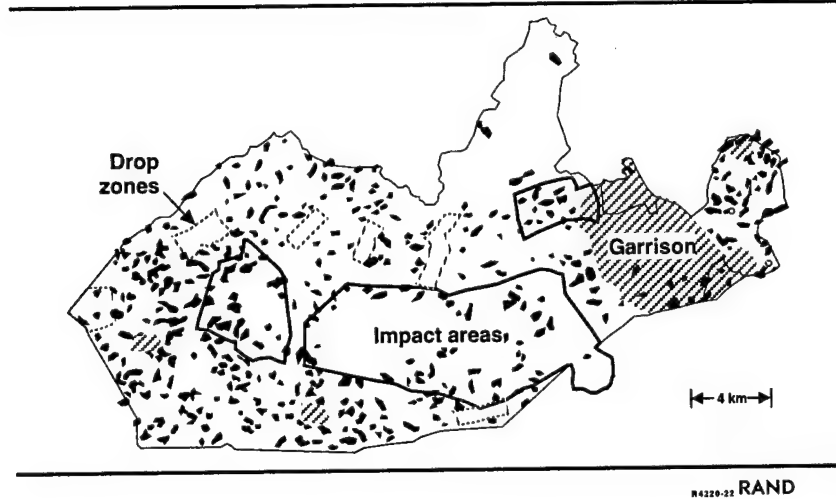


Figure 22

Figure 22 shows the RCW restricted zones. There are more than 400 zones at Fort Bragg, each corresponding to a particular colony. A map similar to Figure 22 is found virtually everywhere that troops assemble on the base. It is labeled "The Woodpecker Special."

RCW Restricted Zones and Rare Plant Locations at Fort Bragg

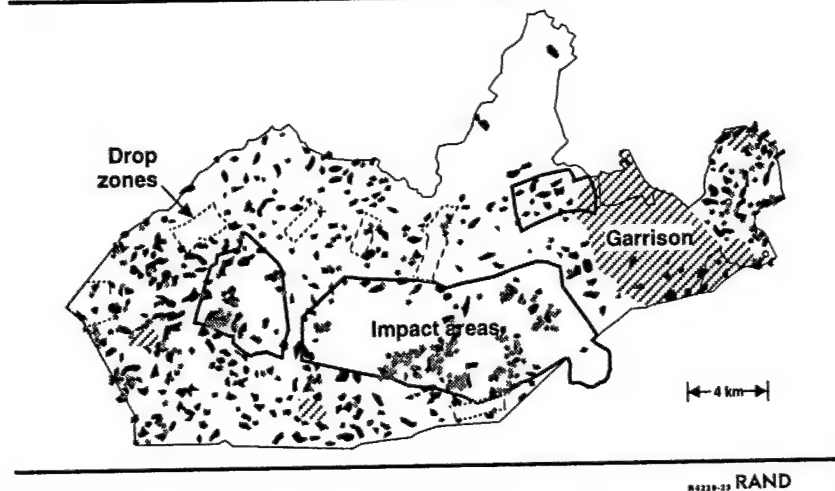


Figure 23

The Biological Opinion also considered endangered plants that are part of Fort Bragg's longleaf pine ecosystem. There are two federally listed endangered plants, the rough-leaved loosestrife and Michaux's sumac. The location and number of these plants is uncertain, and the Biological Opinion recommended that a plant survey be conducted. There are also 207 rare plant species at Bragg.⁵ As listed endangered plants are identified, 200-foot restricted zones are imposed. The restoration of the native fire-based ecosystem combined with continued surveys make it likely that the number of known endangered plants will increase. Plants are particularly susceptible to damage associated with pine-straw harvesting for purposes of revenue generation.

Figure 23 shows the current locations of the two endangered plants as well as the locations of plant species that are candidates for endan-

⁵Based on a communication with the Fort Bragg Directorate of Engineering and Housing.

gered or threatened status. *Only a small fraction of these represent the two endangered plants for which 200-foot training-restricted zones are imposed.* Nevertheless, the total number of plants and their associated areas underscore the scope of potential problems that could still emerge at Fort Bragg.

4. EFFECTS ON COMBAT TRAINING

Outline

- The Army and the environment
 - Environmental restrictions at Fort Bragg
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-

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Figure 24

This section of the report reviews the impact of the restrictions on Fort Bragg's military mission. It must be emphasized that the situation at Bragg is highly dynamic and the restrictions and their impact on the base are still evolving. In addition, some of the parameters that measure training effectiveness are subject to judgement by individual commanders. What seems clear in the following discussion is that environmental restrictions have had an important effect on military training.

Units and Tracked Vehicles at Fort Bragg

<u>Active</u>	<u>National Guard</u>
• XVIII Abn Corps	• 30th Inf Bde (Mech) (Sep)
• 82nd Abn Div	• 218th Inf Bde (Mech) (Sep)
• Army Special Ops Cmd	• 113th Fld Arty Bde
• 3rd and 7th SF Groups	
• JFK Sp Warfare Center	
• 18th Fld Arty Bde	<u>Others</u>
• 20th Engr Group	• ROTC
• MLRS Bn	• USMC (10th Regt Arty)
250 tracked vehicles	950 tracked vehicles

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Figure 25

Figure 25 lists some of the major active and reserve units that train at Fort Bragg. Most of the tracked vehicles are attached to National Guard and reserve units rather than active units. It is tracked vehicles that usually do the most damage to the base ecology.

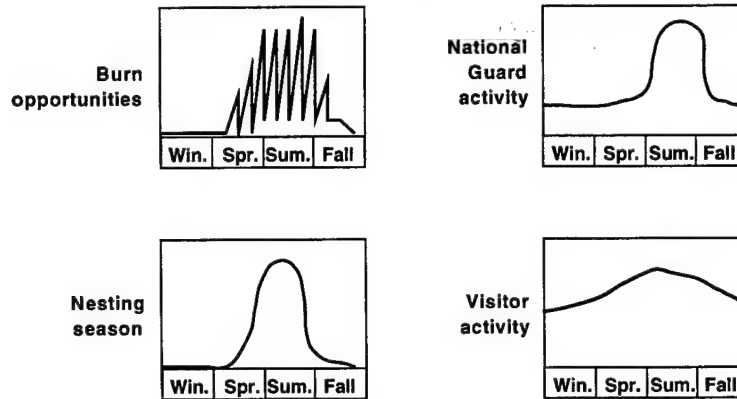
Major active component units include: Corps Support Command, 18th Aviation Brigade, 20th Engineer Brigade, 18th Corps Finance Brigade, 16th Military Police Brigade, 525th Military Intelligence Brigade, 35th Signal Brigade, 1st Special Operations Command, 3rd Special Forces Group, 7th Special Forces Group, John F. Kennedy Special Warfare Center and School, Army Special Operations Command, and 1st Reserve Officers Training Corps (ROTC) Region Headquarters.

Several U.S. Army Reserve (USAR) and Army National Guard (ARNG) units also use Fort Bragg for monthly and annual training. These units include elements of the 30th Infantry Brigade and the 113th Field Artillery Brigade (NCARNG), with two Armor Battalions (one using M1 tanks), three Mechanized Battalions (M113's), and one Artillery Battalion. The U.S. Marine Corps' 10th Regiment has five

artillery battalions that train at Fort Bragg semi-annually. The ROTC units also train during the summer months.

In the absence of accurate data about actual utilization rates, the number of tracked vehicles is a simple but useful measure of the potential impact a particular unit may have on the ecology. The more heavy, tracked vehicles the unit has, the greater the potential damage to the ecosystem. The active units at Fort Bragg include some 250 tracked vehicles; the reserve and National Guard have about 950 tracked vehicles.

Seasonal Variation in Military Activities and Ecological Parameters



R4220-00 RAND

Figure 26

Habitat preservation increases the difficulty of scheduling the diverse training activities that occur at Fort Bragg. The reasons for this difficulty are shown in Figure 26. Scheduling is particularly difficult during the late spring and summer, when critical military and ecological events coincide. Weather and the condition of midstory growth require that controlled burning take place in the summer. The need for several consecutive dry days makes fire setting difficult to schedule. The RCW nesting season occurs during the late spring and early summer. This is a time when the birds require the least disturbed environment.

Military activities also peak at this time of year. The National Guard traditionally schedules its longer-term training sessions during the summer because many of its members are teachers and students. Other off-post units also conduct more exercises during the summer. The FWS Biological Opinion does not consider seasonal variations in allowable activities as part of its "reasonable and prudent" alternatives. Because of the dilemma identified in Figure 26 some unit exercises have recently been diverted to other installations.

The Closure of Range 63

- A \$15 million multi-purpose firing range
 - 5 RCW colony sites, 3 active
 - Biological Opinion allows 8 incidental takes
 - 7 believed to have occurred
 - Natural Resource Office recommended closure
 - Range control saw a major training priority
 - Issue sent to installation commander/JAG
 - Range closed pending FWS opinion
 - Reopened after 9 months
-

R4225-88 RAND

Figure 27

During recent months, a major issue reached critical status. Range 63 is a multi-purpose firing range that contains five total colony sites, three of which are active. The FWS opinion allowed eight incidental takes, and it was estimated that seven had already occurred, although there is great scientific uncertainty in determining a precise count.¹ The Fort Bragg Natural Resource Office estimated that further unrestricted activities might result in takes due to extensive overlap of RCW forage activities. It was also recommended that further activities not result in additional injury to any pine trees.

The story of Range 63 demonstrates a changed perspective at Fort Bragg. Certainly the Biological Opinion has given natural resource personnel new authority in their interactions with other garrison or mission personnel. There is also a new recognition of the seriousness and complexity of the issue. The range-control personnel, and particularly the staff at Range 63, are very much aware of the restric-

¹In Forest Service clear-cutting activity, the destruction of habitat was interpreted by the court to constitute a take; see discussion under Figure 16.

tions and have attempted to mitigate the damage to the colonies. Unit commanders are now thoroughly briefed, and exercise scenarios are now designed to minimize damage. In fact, three RCW's were hatched from a cavity tree on the range during the summer of 1991. This is a favorable sign, but it does not necessarily imply that range activities are compatible with RCW conservation.² On August 10, 1992, Range 63 was reopened after Fort Bragg received a No-Jeopardy Opinion from the FWS. Incidental take of one colony was permitted and Bragg was required to undertake mitigation activities elsewhere on the post.³

Further proof of the transformation of Fort Bragg and its recent successes in RCW conservation is that the FWS RCW coordinator (R. Acosta) believes that the North Carolina Sandhills population, dominated by Bragg, will be the second RCW population to achieve recovery status. Apalachicola, in Florida, is the only population (of the 15 in the United States) to attain recovery status.

²The fires caused by ammunition on firing ranges could have a beneficial effect on the habitat.

³Based on a communication from Fort Bragg natural resource personnel.

Impacts on Training for All Units

Mission	Impacts
Defense	Digging restricted; limits realism
Dispersion	Reduced inside colonies
Maneuver	Channelized to existing trails
Night operations	Vehicular movement slowed/restricted
Smoke operations	Restrictions inside and outside colonies
Camouflage/ concealment	No cutting pine trees for hasty camouflage; overhead concealment areas denied
<div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <ul style="list-style-type: none"> •Bad habits •Tactics required that are inconsistent with military doctrine </div>	

R4220-88 RAND

Figure 28

The restrictions detailed by the Biological Opinion, coupled with those measures needed to reduce erosion, affect all military units. The effects of these restrictions are summarized in Figure 28.

Defensive operations are restricted in terms of ability to dig-in fighting positions, vehicle defilade positions, command and control bunkers, and to create obstacles such as tank ditches. A former infantry battalion commander argued that the restrictions prevented him from effectively planning and executing a battalion anti-armor defense during an external evaluation (EXEVAL).⁴

Combined arms operations are limited, maneuver within the colonies is restricted, and units are artificially channelized to existing trails. The high density and ubiquity of the colonies make it extremely difficult to find adequate unrestricted terrain for operations at company or battalion level. Many of the violations within colonies have surfaced during night operations; the markings are not clear under

⁴EXEVAL is a training exercise where evaluation is conducted by officers who are not part of the unit being evaluated.

blackout or infrared conditions.⁵ As a result, units are understandably reluctant to displace or maneuver during hours of darkness, although night operations are emphasized in the Army's training and fighting doctrine.

⁵There is an ongoing effort to adopt white markings to enhance night visibility.

Impact on Armor and Aviation

Mission	Impacts
Maneuver	Formations restricted to platoon size 3-73 AR cannot conduct EXEVAL Cannot train to Mission Essential Task List (METL)
Gunnery	Multi-purpose Range Complex threatened w/restrictions
	Potential threat to aviation units
Gunnery	Target Access road through wetlands

82nd ABN DIV Armor Bn at reduced readiness

R4220-88 RAND

Figure 29

The 3-73 Armor Battalion, the 82nd Airborne Division's single armor battalion, was reported early this year to be at a decreased level of training readiness because of the restrictions. The confined widths between RCW restricted zones limit maneuver formations to platoon levels; the 3-73 unit cannot conduct a battalion EXEVAL. Additionally, prohibition on firing training and service rounds at Range 63, the \$15 million multi-purpose range complex, will severely hamper gunnery training. Most of the armor and mechanized infantry units that use Fort Bragg are Army National Guard with limited training time. The restrictions could impair their attempt to maintain training realism.

Range 78, which is used for aviation gunnery, may be affected because of RCW restrictions and because the target access road crosses a wetlands area. Five firing points were reported as not usable, and ten others are inaccessible. Closing this road makes the target area inaccessible to service and target replacement.

By the summer of 1992, a number of armor, mechanized, and aviation gunnery units had already been diverted to other installations where

they could still conduct live fire exercises. The associated transportation costs may have hampered the ability of these units to conduct other necessary training.

Impact on Artillery and Engineers

Mission	Impacts
<i>Artillery units</i>	
Displacement	30% reduction in available firing points
Night operations	Restricts movement
RSOP	Fewer tactically sound positions available
<i>Combat engineer units</i>	
Defense	Digging fortifications restricted; limits realism
Offense	Breaching operations restricted; limits realism
<div style="border: 1px solid black; padding: 5px; text-align: center;"> Teaches wrong doctrine and procedures Engineer Battalion at lower readiness </div>	

R4220-48 RAND

Figure 30

The artillery units are affected in the tasks of reconnaissance, selection, and occupation of positions (RSOP); maneuver through colonies; night operations; and dispersion. A 30 percent reduction in the number of firing points forces units to utilize the same known positions.⁶ During large exercises such as Dragon Fire, which included some 15 to 17 artillery battalions, movement and displacement were severely restricted. Less desirable, less tactically sound positions were selected, which resulted in teaching incorrect doctrine and procedures to young officers.

The Engineer Battalion was also at a decreased level of training readiness. All land-disturbing activities that can damage potential forage areas or affect streams and natural watersheds must remain outside colony sites and areas. Therefore, the preparation of defensive positions and the use of heavy equipment in support of infantry task force EXEVALs are severely restricted; breaching operations during offensive operations are also limited. The heavier units from Corps and the reserve component are similarly affected.

⁶Data developed by Corps artillery units.

Summary of Effects on Combat Training

Unit type	Effects	Consequences
Armor	<ul style="list-style-type: none"> • Platoon formations only 	Cannot train to Mission Essential Task List (METL)
Engineer	<ul style="list-style-type: none"> • Few fortifications • Little breaching 	Cannot train to METL
Artillery	<ul style="list-style-type: none"> • 30% less firing points • Fewer tactically sound positions 	Loss of realism
All units	<ul style="list-style-type: none"> • Difficult night ops • Limited smoke • No hasty camouflage • Limited dispersion 	Significant distraction

R4220-88 RAND

Figure 31

Figure 31 summarizes the impacts of environmental restrictions on combat training. Depending on the type of unit, effects range from "distraction," to inability to perform tasks on the Mission Essential Task List (METL). The METL provides the battle focus for a commander's training program.

In all cases, commanders felt the ability to conduct realistic training was affected. The inability to employ tactics realistically affects all units, and as a result, inconsistent doctrine and procedures are encouraged during training exercises. Artificial situations occur and bad habits are acquired. Because of the types of ARNG units, they could cause more damage than the active units.

The effects on training highlight several key requirements for the Army. First, because the RCW population has been driven to such a critical stage, disturbances to the RCW such as noise and smoke are (conservatively) assumed to be damaging in the absence of pertinent scientific data. The Army will need to take responsibility for studying this unique type of military-specific applied biology. Difficulty during night operations might be overcome by technology that would give troops real-time readouts of their positions relative to restricted

zones. Such troops might also need to remain at Bragg for extended tours to learn to master these procedures. Thus, there are possible implications for the Army's basing structure and its R & D programs. Bragg now expends considerable resources on studying the demographic, habitat, and fertility characteristics of its RCW population.

5. CONCLUSIONS: LOOKING BACK AT FORT BRAGG

Outline

- The Army and the environment
 - Environmental restrictions at Fort Bragg
 - Two installation missions
 - Evolution of the process
 - Effects on combat training
 - Conclusions
 - ➔ – Looking back at Fort Bragg
 - Lessons for the Army
-

R4220-44 RAND

Figure 32

The last section of this report discusses the policy implications for Fort Bragg and the Army. With the benefit of hindsight, we consider how Fort Bragg could have approached the challenge implied by the Endangered Species Act.

This is a retrospective analysis. It is not intended to provide detailed recommendations for Fort Bragg as it continues to cope with wildlife and conservation issues. But a number of useful insights emerge at the strategic level. These insights, and the lessons learned from the Fort Bragg experience, could assist the Army in formulating a strategy to anticipate and confront similar challenges before crises erupt at other installations.

The Army's Response at Fort Bragg

- Avoid—*treat as a distractor*
 - Isolate—*delegate to overwhelmed environmental office*
 - React—*cooperate with limited analysis*
 - Suffer—*live with restrictions, talk about exemptions*
 - Plan and negotiate . . . (?)
-

R4220-86 RAND

Figure 33

The five stages of response that led to the current situation at Fort Bragg are summarized in Figure 33. For many years, avoidance of the RCW/combat training dilemma was the main response. After the base understood its duty to consult with the FWS, the issue was relegated to a single garrison directorate largely staffed by civilians. Those responsible for military training felt little need to understand and participate early in the consultation process and, more importantly, to properly delegate authority and share responsibility for the outcome of the negotiations. After recognizing the serious consequences, officers made ill-informed but well-intended promises that further damaged Army credibility. *Ultimately, placing such wide-ranging issues within a single garrison directorate prevented the Army from formulating a comprehensive alternative to better balance its mission and stewardship responsibilities. This was compounded by the traditions of installation local autonomy, "stovepiping" and rapid staff turnover, and the inability of the Major Command (MACOM) and the Department of the Army (DA) to formulate a sustained and realistic program for resolving RCW-training issues.*

Both the attitude and situation at Fort Bragg are now quite different. There is a much greater interest in conducting planning and the Department of the Army is beginning to look at systematic ways to support installations. Still, it will take many years to reverse conditions and options for optimizing training while conserving resources may have been lost.

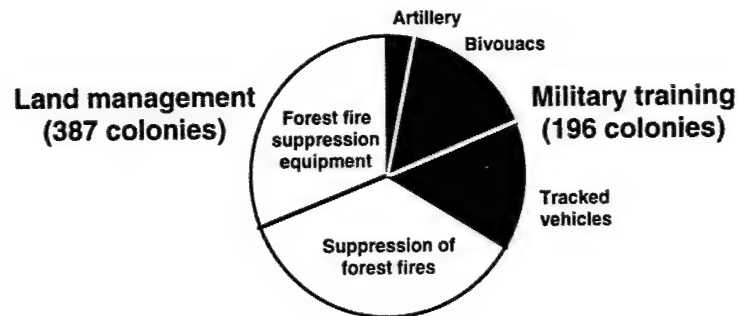
Combat trainers are accepting the restrictions,¹ despite dissatisfaction and Army-wide rumblings about obtaining an exemption from the ESA. In 1978, the ESA was amended to permit the Secretary of Defense to (in effect) authorize an exemption for national security reasons. To this day, there is no precedent for, and few legal writings about, such an exemption. Given the politically charged nature of the exemption process, and the mandatory cabinet-level involvement, it seems prudent for the Army to exhaust every alternative before seeking an exemption.² It therefore is important to reflect on how the process might have proceeded had the Army developed a careful and balanced plan for protecting the RCW.

¹There have nonetheless been a number of reports of recent violations of the terms of the Biological Opinion.

²The national security exemption process has never gone to completion. The Marines initiated the process during the late 1970s as a result of RCW restrictions at Camp LeJeune, but the exemption request never reached the OSD level. Also, in November 1978, President Carter sent a letter to then Secretary of Defense Harold Brown stating that his administration opposed the concept of a national security exemption and that it should be invoked only during an emergency.

Senator Scott of Pennsylvania, who supported the National Security Exemption in Congress, proposed that the exemption was intended for extreme circumstances where, for example, an intercontinental ballistic missile could not be launched because a listed bird would be placed at risk by the launch process. Also, a former Secretary of Defense recently suggested that the National Security Exemption would realistically only be invoked once, presumably because of the enormous political controversy it would generate.

Analyzing the Data on Colony Site Damage



SOURCE: Army Biological Assessment

NOTE: Some colony sites clearly had multiple damage incidents.

R4220-88 RAND

Figure 34

The Army has a tremendous negotiating advantage with regulatory agencies or advocacy groups because it should have the most detailed knowledge of the actual condition of the habitat and the effects of military training. No other institution will have this knowledge and experience. *Thorough observation and careful analysis should provide a source of systematic advantage for the Army.* It would have been advantageous to carefully examine the sources of RCW habitat damage at Fort Bragg. Figure 34 presents the Army's own data regarding the causes of the independent incidents that resulted in colony site damage. The data suggest a potential negotiating strategy that might have been pursued.

Had the Army fully analyzed its own data, it would have realized that military training might have been less damaging than the traditional fire suppression policy, which was rooted in the tradition of land management that promoted timber sales for revenue generation. According to the data included in the Army's Biological Assessment, the combination of forest fire suppression and the equipment used to suppress forest fires (as illustrated in Figure 15) had adverse effects that were comparable in scale to military training. A land-manage-

ment policy aimed at preserving the ecosystem, and implemented many years ago, might have offset many of the damaging results of training. These consequences undoubtedly could have been minimized by intense troop education, a culture of concern, and avoiding careless and unnecessary incidents. Developing new skills in conducting training in a manner that conserves the habitat, but allows flexibility at critical points during the exercise, might also be valuable. Such policies might have prevented the degrading of the habitat to its current critical stage.

What the Army Might Have Done

- Maintained a land-management policy with two priorities
 - Combat training
 - Ecosystem conservation
 - Avoided the careless training incidents
 - Had a top Army policy team
 - Recognized the “command” issues
 - Role of XVIII Airborne, National Guard, tenants
 - Offered an Army plan
-

R4220-88 RAND

Figure 35

Figure 34 suggests that a land-management policy that sought to maintain proper training facilities while simultaneously conserving ecosystems could have limited the conflict between training and ESA compliance. Figure 35 suggests other steps that might have been included as part of a comprehensive strategy.

Had the Army demonstrated an early commitment to educating officers and troops, training-related damage could have been reduced and the climate for negotiation improved by this demonstration of good faith. It is also possible that much of the damage to the RCW habitat was due to base users other than the active units. (Figure 25 shows that the majority of tracked vehicles are not associated with the XVIII Corps.) Also, the military mission and ecological requirements at Fort Bragg could be better balanced if selected off-post units were diverted to installations that were more environmentally robust.

In addition to the inability (and inappropriateness) of the DEH to make command-level decisions, it was required to deal with a complicated scientific, legal, and regulatory issue with very little expert support. Although restoration and compliance (rule-based laws) are highly institutionalized parts of the Army's environmental program,

conservation and preservation (planning laws) are not. The DA natural resources staff is small and does not have the capabilities in wildlife biology to effectively support the installations. However it is also important to remember that the tradition of installation local autonomy may have acted to deflect potential support.

All of these factors suggest that the Army might have preempted the initiative and demonstrated good faith by proposing a plan early that offered an equal level of protection to the RCW with fewer serious impacts on combat training. However, such a plan would only have been formulated had the command structure, including the installation commander, and perhaps FORSCOM and National Guard commanders recognized early on the scope of trade-offs that were involved and participated actively in the process of formulating timely and balanced proposals for complying with the ESA.

Such a planning process would also require modifying the management tradition of installation autonomy and developing a systematic method of supporting environmental planning at the installations. This should involve creation of a MACOM or Department of the Army expert team to provide technical support. Such a team should include expertise in military training, wildlife biology, natural resource and environmental law, and base operations.³ One possibility is to recruit a respected FWS regional official or academic researcher to provide expertise in wildlife biology. It might also be useful for the FWS to recruit a retired military officer with considerable training experience who could interface with DoD counterparts. It also appears that the long tradition of Army decentralization and relative local autonomy is matched by a similar but shorter-lived tradition on the part of the FWS and its regional offices.⁴

³Familiarity with regional questions, at both the scientific and regulatory level, would be essential for this team to be effective.

⁴The issue of rapid turnover of key military personnel can be resolved by longer rotations, and the turnover among civilians can be minimized by improving working conditions and job status. It may require several years for garrison staff to develop adequate expertise and credibility with regulators and activists. Given that ESA consultations and negotiations could be multi-year activities, it seems contrary to the Army's interests to rotate garrison staff at the stage when they could be most productive.

Could Army Leadership Have Produced a Better Plan?

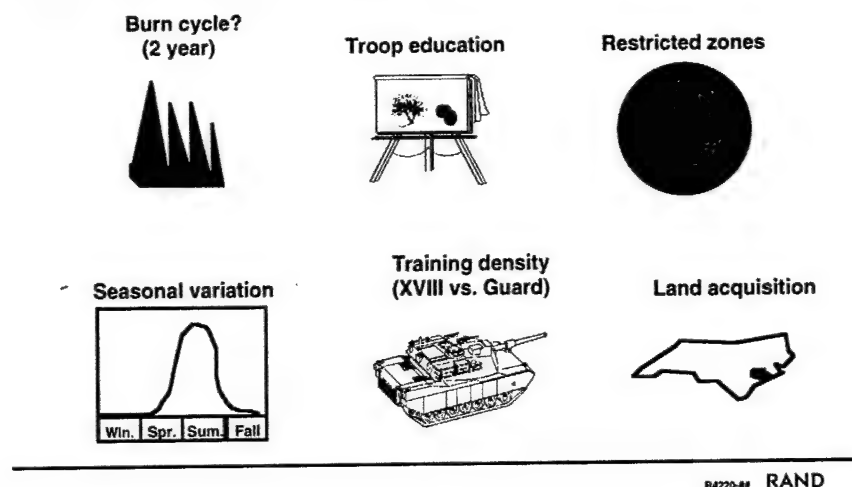


Figure 36

Figure 36 illustrates the elements of an alternative plan that might have been proposed at an earlier point. As stated earlier, a land-management policy that emphasizes ecosystem preservation was (and is) essential. For example, the FWS originally suggested a two-year burn cycle but accepted a three-year cycle. The Army might have considered a two-year cycle as part of a future package to offset training restrictions. Troops might have been used to aid in midstory removal.⁵ Some seasonal variation in training activity might also

⁵This recommendation and the two-year burn cycle were included in the Biological Opinion. Although a few troops would be diverted from training, the impact on combat training might be positive if the activity could be exchanged for greater flexibility. Mechanical and manual removal also helps mitigate the air pollution effects of frequent burning. Troops would be essential because Bragg's Natural Resource Office currently lacks the manpower for mechanical removal. Limited experience using troops suggests that some training in the activity and an understanding of the activity's importance would be needed for effective implementation. We also note that some recent improvement in the control of understory growth may now make a more rapid cycle less critical. The above recommendation may have been appropriate at an earlier point, but as is typical of the measures needed to implement the planning laws, their criticality may vary with the condition of the ecosystem. (Based on a communication from the Fort Bragg Directorate of Engineering and Housing.)

have been part of the package, as well as an intensive and structured user-education program. Currently, enforcement of the restricted zones is left to a small staff of installation game wardens. More strenuous enforcement might have been another way of providing additional protection to the RCW.

Undoubtedly, training density was the major bargaining chip, outside of land-management practice. Army leadership needs to establish priorities: to decide whether Fort Bragg should be reserved for the active contingency corps (XVIII) and whether base activities by other users should be reduced (or eliminated) to gain greater flexibility. These decisions are painful in terms of political realities, but they could form part of a policy of constructive engagement with FWS and environmental groups.

Finally, the option of further land acquisition should be considered. Land acquisition is increasingly difficult, but the good relations between Fort Bragg and the surrounding community may allow this option. An attempt to acquire land would demonstrate the Army's commitment to reducing training density.

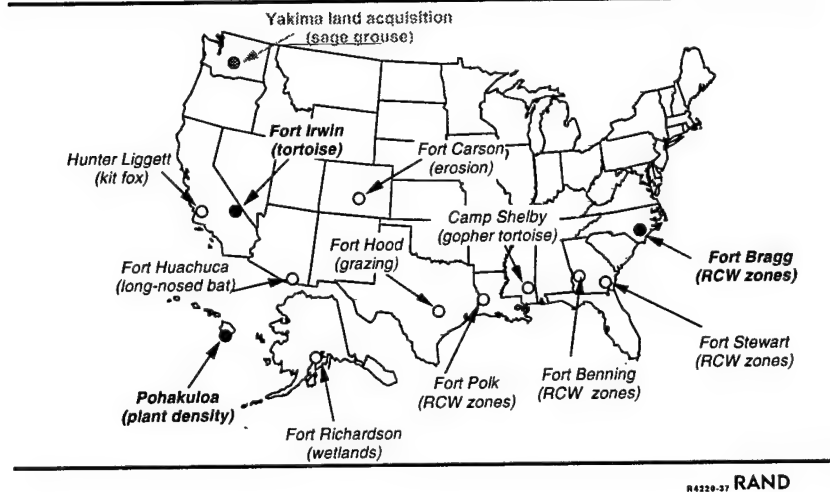
At a more speculative level, Bragg and the other RCW-impacted Army bases could participate in a proactive program to monitor and ultimately enhance RCW populations using protocols that are just now being tested in the field (see Figure 13). Some of these activities might be executed by uniformed personnel who have acquired the proper training in wildlife biology.

Independent of the options presented in Figure 36, there is a continuing need for comprehensive installation-wide natural resource planning. There are now in effect two major priorities at installations: military training and preservation of natural resources. All of the activities comprising the work of the installation should be considered as tools to develop an optimal balance. The artificial separation into fragmented firing range, maneuver area, and garrison consultations can only reduce the scope and flexibility of trade-offs that can be made. Failure to adopt this broader view will ultimately result in a less than optimal outcome for the ESA process. Integrated installation-level planning is essential. Such planning should also incorporate issues related to the regional ecosystem that stretches beyond Fort Bragg, including other public and private lands in the North Carolina Sandhills.

The advantages of a regional approach were shown recently when Fort Bragg and the FWS jointly sponsored the September 1992 Sandhills RCW Conference to initiate discussions with Sandhills

landholders about a comprehensive Sandhills recovery plan. The meeting was addressed by the Army Chief of Staff, the Director of FWS, and Michael Bean of EDF. Not only did the Conference introduce participants to the possibility of a regional approach, but it afforded Bragg and FWS an opportunity to demonstrate their ability to cooperate, and gave Bragg a forum for describing its comprehensive and successful RCW-related activities. As noted earlier, a number of promising technical approaches are being pursued to augment the RCW population, as well as the development of a corridor for connecting otherwise isolated populations. Professor P. D. Doerr of North Carolina State University suggested that "biology will determine the value of various policy alternatives," and Michael Bean of EDF proposed a concept similar to mitigation banking or "marketable permits" whereby the Army might offer incentives to cooperating landholders in exchange for limited takes at Bragg to facilitate training or construction projects.

Fort Bragg Is a Bell Ringer



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Figure 37

The Army and the nation are fortunate that no other installation has yet approached the crisis of Fort Bragg in terms of the magnitude of the conflict between national priorities: maintaining a well-trained and ready military force, and conserving sensitive or unique ecosystems. Nonetheless, there is a growing national will to identify and protect natural and cultural resources, and the Army should expect increasing numbers of interventions and restrictions. It is also possible that regulatory pressure on certain federal lands will grow more intense to compensate for an expected easing of control on land where economic factors predominate. Even if restrictions at Fort Bragg cannot be rolled back overnight, they should be viewed as a call for the Army to develop effective responses to this issue.

Figure 37 shows some of the Army installations that are now coping with important natural resource concerns. One critical example for the Army is the proposed land expansion of the National Training Center (NTC) at Fort Irwin, which has been set back by a draft FWS

Jeopardy Opinion regarding the desert tortoise.⁶ Forts Stewart, Benning, and Polk have less extensive RCW populations than Fort Bragg but must also operate with restricted zones.⁷ As discussed earlier, three Army civilians were indicted at Benning for activities related to timber harvesting.⁸ Realignment has raised questions about the interaction between training and natural resources at Fort Hood, Fort Huachuca, and Camp Shelby. Training at Fort Carson (Pinon Canyon) is restricted during wet weather because of erosion problems. Inaccurate surveys in combination with the high density of rare plant species have at least temporarily stopped Army plans to build a firing center at the Pohakaloa training center.

A more positive example is Fort Lewis and its sub-installation, the Yakima Firing Center. Although there are restrictions during wildlife nesting seasons and in stream crossings, the Army offered to protect the sage grouse, a threatened species. This aided the Army's recent apparently successful acquisition of new land at Yakima.⁹ In addition, more than 50,000 acres at Fort Lewis have been designated as a critical habitat for the spotted owl.

We must emphasize again that while the situation at Fort Bragg was allowed to reach crisis levels and the NTC expansion is in suspense, these two installations are probably several years ahead of the others in terms of the seriousness of the issues they portray. A unique set of factors involving land-management policy, an intense military mission, an overused installation, and an extremely sensitive ecosystem came together at Fort Bragg. Other installations are coping with related but less critical issues. The Army still has time to develop skills and organization needed to meet these challenges. We must also remark that the DA command structure was alerted to the Bragg con-

⁶The FWS issued a draft Jeopardy Opinion that was sent in a letter to the commander of Fort Irwin on September 20, 1991.

⁷Fort Stewart received a draft Jeopardy Opinion from the Fish and Wildlife Service on January 30, 1992. Restricted zones in the Opinion are similar in size to those at Fort Bragg, though the population is smaller and less pervasive at Stewart. However, surveys at Stewart are not as yet complete.

⁸It is interesting to note that the 1984 Sierra Club suit against Fort Benning for violation of the ESA conceded that military training did not have a significant impact on the RCW. John Beasley, "The Army and the Red Cockaded Woodpecker: Managing an Endangered Species," thesis, George Washington University, September 30, 1991, p. 77.

⁹The director of the Yakima Valley Audubon Society told us that he had sent a letter to Senator Gordon recommending the acquisition.

flict between ESA and training in 1989, but virtually no effective and enduring program was developed to resolve training-ESA conflicts at that time.

6. CONCLUSIONS: LESSONS FOR THE ARMY

Outline

- The Army and the environment
 - Environmental restrictions at Fort Bragg
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 - ➔ – Lessons for the Army
-

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Figure 38

In the last section, we discussed the implications of the lessons learned at Fort Bragg. We believe that these lessons could form the basis for an Army strategy to more effectively respond to environmental-planning laws.

A Proactive Strategy Based on the Experience at Fort Bragg

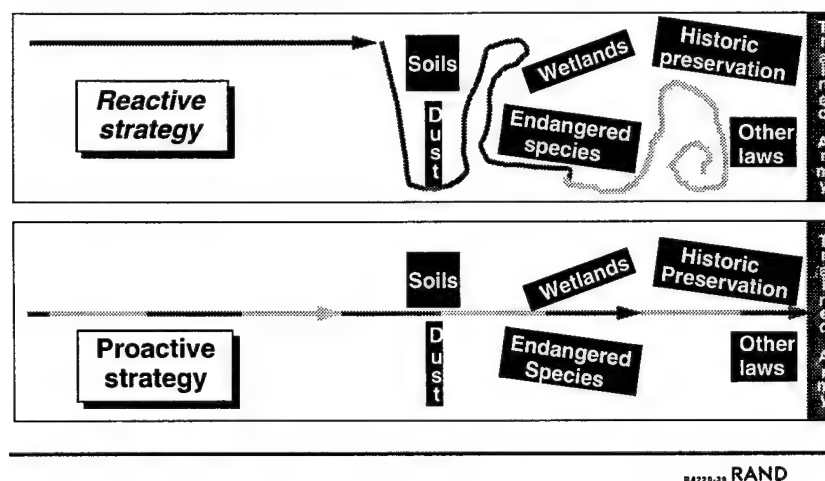


Figure 39

One lesson of the Fort Bragg experience is that the land-use planning laws described in Figure 39 are comprehensive but are far less prescriptive than the rule-based environmental laws that regulate hazardous waste, or point sources of air, or water pollution. Thus, the planning process entails negotiations that require expertise, good faith, and transparency on the Army's part. To succeed, the Army must bring all of its assets to the negotiating table, not merely those of the DEH or any other single office. It will need to better understand the biology and ecology of its training land if it is to reach its training goals while managing its resources soundly.

It is the combat army as trustee and user of federal land that ultimately needs to take responsibility for protecting it. Had the combat army accepted this role, and combined it with knowledge of local ecology, many of the difficulties at Fort Bragg might have been prevented. Although resources for obtaining such knowledge could divert a few soldiers from combat training, it is basically a question of optimization rather than diversion. We also note that assigning greater responsibility for training lands to the combat army implies

an exception to the overall trend of separating the soldier from base operations. But the linkage between continued training and proper land management is so strong that there is little other alternative.

Figure 39 portrays the nature of the planning laws in more descriptive terms. When the Army generates industrial pollution, permits are requested and obtained and inspectors from state or federal agencies will verify compliance. However, an armored vehicle may traverse a hill many times before the cumulative erosion or habitat degradation results in the violation of a statute. As a result, it is possible to ignore planning laws for extended periods, as is shown in the upper part of Figure 39. It is also possible to view individual decisions in the context of the significant scientific uncertainties and err consistently on the side of unmodified military training. However, as Figure 39 illustrates, either ignoring these issues or failing to use unbiased estimates at every stage of the planning process could have the cumulative effect of damaging the installation's credibility when others review the final plan. This could ultimately place the Army at risk of not achieving its training objectives.

The central lesson of Fort Bragg is displayed on the bottom diagram in Figure 39. If the Army performs long-range planning that coordinates ecosystem protection and combat training, it could move through the planning maze in a more predictable manner with minimal interference from regulators and activists. If the Army is to effectively respond to the planning laws, it should mix the shades of green in an approach that involves long-range integrated mission and ecological planning.

Competing Land-Management Priorities

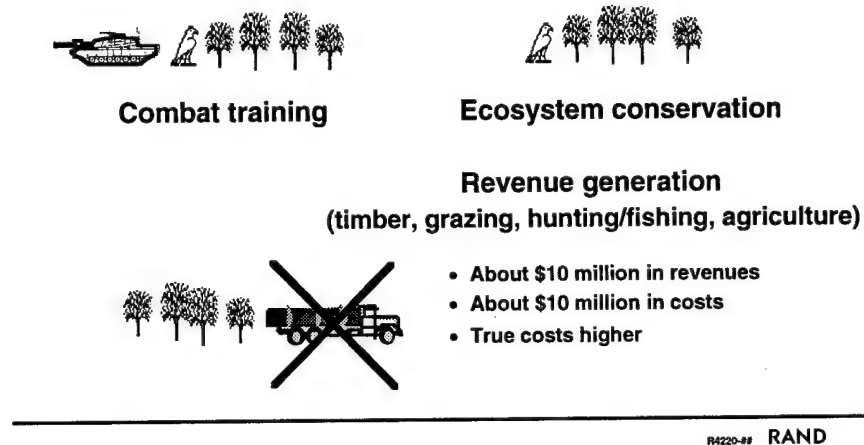


Figure 40

One step toward mixing the two shades of green is to ensure that insidious and extraneous incentives do not interfere with the military and environmental missions. Despite the Army's historic tradition of conservation, its natural resource program is at least partially rooted in concepts of forestry and grazing that are sometimes inconsistent with ecosystem management. Although timber harvesting can at times support preparation of training lands, or even ecosystem conservation, as a goal it could engender hidden costs. Also, it may foster a set of incentives that are inconsistent with the Army's more central mission.

The hazards and hidden costs of timber harvesting and land management for purposes of generating revenues while simultaneously preparing the land for military uses were demonstrated at Fort Bragg. Problems have also occurred at Forts Benning, Stewart, and Hood. As is shown in Figure 40, Army-wide revenue-generating programs produce only between \$10 million and \$15 million, and much of

this is required to maintain the programs.¹ Some of the revenue is actually used to support ecosystem conservation efforts or is returned to the local community. We have no evidence that hunting and fishing on Army lands create serious conflicts for conservation or training. The popularity of these activities is generally a factor in maintaining community support. However these activities should be carefully scrutinized to insure that no long-term conflicts exist.

A first step toward an effective ecosystem strategy is to redefine the goals of Army natural resource activities away from income generation and toward a proper balance between military uses and legally required resource conservation and preservation. *For this to be effective, funding for conservation programs currently derived from revenue-generating activities needs to be replaced.* Revenue-generating programs may also have important Army and civilian constituencies. Efforts to restrict them could require a concrete demonstration of the damage they can inflict on the training mission and the ability of the Army to comply with natural resource law.

¹The 1989 Defense Environmental Status Report (DESR) reports \$1.2 million in Sikes Act fees collected (for recreational use of Army lands), \$3.2 million in grazing receipts, and \$8.2 million in forest product receipts. This makes a total of \$12.6 million in revenues for 1989, although some activities may have been curtailed since 1989 due to planning law restrictions. The 1989 DESR reports \$6.1 million in expenses and \$1.1 million in investments for the grazing program, and \$0.3 million in unreimbursed costs and \$7.5 million in reimbursed costs for the forest products programs. Depending on the specific activities represented by the \$7.5 million, total expenses were between \$7.5 million and \$15.0 million for 1989.

Mixing the Shades of Green

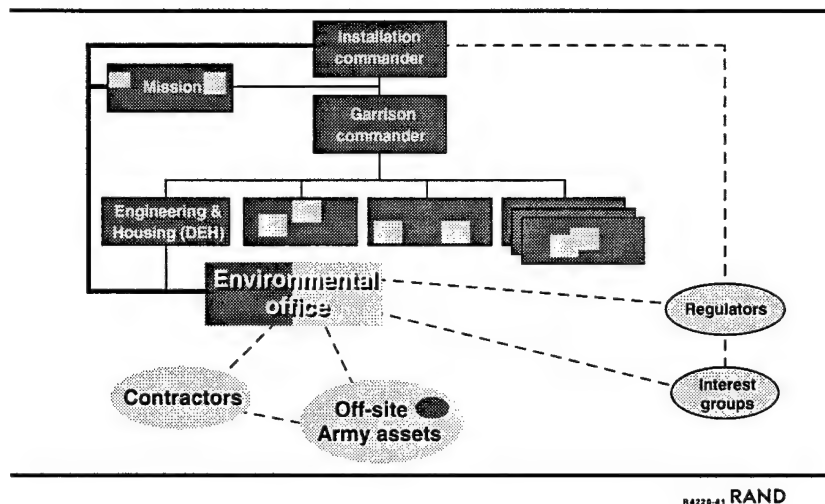


Figure 41

A second step in an effective response to the planning laws is to recognize that they are pervasive and require a coordinated response by natural resource staff and trainers working as a team at the installation level. Although a "contract-out" response may be appropriate for complying with the rule-based laws, the planning laws imply the need for an unusually competent installation environmental office that is also knowledgeable about the training mission. Because of the direct connection between military goals and critical environmental issues, the need to coordinate with the combat mission, and the systemic barriers to hiring or retraining environmental professionals, the Army should consider the use of a small number of trained and educated soldiers in the combat arms branches to serve in installation environmental roles. However, as discussed below, these roles emphasize the impact of environmental protection and conservation on combat training, rather than classic hazardous waste management. Officers and enlistees with some prior training or experience in fields such as wildlife biology or ecology may be suitable candidates for a pilot project.

There has been significant discussion within the Army about the proper organizational design for the environmental program. Responding to the planning laws is a complex, multi-disciplinary problem, and there is clearly no simple organizational fix. Both an environmental culture and needed capabilities should be mixed throughout the organization. Also, some installations may need more intense command involvement than others, particularly if they are engaged in a sensitive ongoing consultation/negotiation process. Others may require less involvement or closer coordination for only a short period of time.

The shading of Army green in the "off-site offices" also has a special significance. The Army staff needs to track the planning processes at individual installations and, if possible, lend support. There is currently no expert institution for environmental issues directly related to training.² In addition, such issues as the effects of smoke and noise on RCWs imply the need for Army research to address those ecological issues not typically addressed by university professors.

²Capabilities are scattered. The Engineering and Housing Support Center (EHSC) has a small staff of civilians that monitors natural resource conditions on Army bases. The Construction Engineering Research Laboratory (CERL) is an Army Corps of Engineers laboratory that provides a variety of reimbursable land-management services to Army bases. There is, however, no expert, mission-funded institution that integrates expertise on natural and cultural resources, combat training, and the policy process and uses that integrated knowledge to support installations.

A small team is being established within the office of the Deputy Chief of Staff for Operations (DCSOPS). This may represent the start of a capability similar to that described here. For the team to be successful, it needs to include expertise in wildlife biology, law, training, engineering, and base operations. It should also operate to develop a tradition of balancing priorities.

Recommendations for the Army

- **Recognize the comprehensive effects of planning laws**
- **Build internal planning capabilities**
 - At headquarters
 - Army post environmental offices
- **Develop green suit roles (careers, rotations, education)**
- **Review land-management policy**
 - Base Realignment and Closure (BRAC)
 - Revenue generation
 - Ecosystems

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Figure 42

The Army must satisfy two types of environmental challenges: one based on highly prescriptive rule-based laws and the other on planning laws. The philosophical differences between these two approaches render planning law compliance less amenable to formal Notices of Violation and a contractor-based approach to solving problems. For these and other reasons, planning law compliance has not received funding or priority commensurate with its impact on mission effectiveness. Despite their deceptive vagueness, the planning laws are equally comprehensive, although their impact can be delayed. New planning capabilities must be developed and coordinated at Army installations and at headquarters to assure effective and proactive compliance.

An effective response to the planning laws will require individuals with expertise in combat training, land-use management, ecology and/or wildlife biology. When combined with the need to build an environmental ethic and the difficulties in hiring and maintaining civilian environmental work forces, a convincing argument can be made to

develop environmental or natural resource career paths for soldiers.³ A proper program would combine education, training, and longer rotations in order to enhance expertise and credibility in solving environmental problems specific to individual installations. It might be possible to select officers and enlistees with previous training or experience in the requisite specialty. Another possibility is to seek civilian environmentalists with past Army experience in combat arms training. Longer rotations for all units might also facilitate the development of combat training skills despite the presence of installation-specific restrictions.

Finally, the events at Fort Bragg have significant implications for Base Realignment and Closure. The carrying capacity of the land is a critical factor in determining the role of an installation. Thus, the Fort Bragg ecosystem cannot tolerate intense high-density training and might logically be reserved for the XVIII Corps. *The "depoliticized" base realignment and closure process presents an opportunity to minimize future restrictions due to conflicts between environmental and resource conservation and the ability to carry out military missions properly.*

³The Department of Defense has previously rejected the development of Military Occupational Specialties (MOS) on the grounds that the private sector can supply environmental professionals and technicians more efficiently [see *Evaluation of an Environmental Specialty Career Field for Military Personnel, Report to the Committee on Armed Services of the United States House of Representatives, prepared by the Office of the Assistant Secretary of Defense (Force Management and Personnel)*, April 1991]. Our recommendation differs in that we see the need for soldiers to engage in the specific wildlife and conservation issues that affect combat training. Such positions require knowledge and judgment in both military and ecological issues. Thus, we are not suggesting an environmental MOS that duplicates capabilities available in the private sector, or by Army civilians. It may also be a secondary skill in order for soldiers to gain experience in traditional combat branches.

Recommendations for DoD

- **How to protect the environment of federal lands is an enduring debate driven by:**
 - Private sector/states/DoE (rule-based)
 - BLM, Forest Service (planning laws)
 - **DoD should participate in a responsible way and identify unique issues**
 - **Start with reauthorization of Endangered Species Act**
 - Effects on mission
 - DoD role in preservation
 - System wide trade-offs
-

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Figure 43

Finally, the analysis points to a broader requirement for the DoD to participate in the continuing debate about environmental protection on federal lands. The evolution of rule-based law is largely determined by issues and problems related to private sector activities. Department of Energy-related cleanup problems probably have had the biggest federal agency impact on the recent evolution of the rule-based laws. Planning laws are primarily defined by issues associated with the Bureau of Land Management (BLM) and the Forest Service. Although DoD possesses greater budgets and has more personnel than all of these agencies, its environmental problems are not likely to dominate the overall debate. This seems particularly true at a time when the nation's security establishment is in a downsizing mode and DoD may be reluctant to risk reduced support in exchange for greater environmental flexibility.

But DoD must prepare to enter the debate in a prudent and responsible way. This means it should accept national environmental priorities and not seek nonemergency exemptions from those priorities. Instead, DoD should document the effects of emerging conservation and environmental obligations on its mission and offer

recommendations about how national environmental goals can be achieved in a manner that is consistent with DoD's unique mission and capabilities.

A logical starting point is the coming reauthorization of the Endangered Species Act, which, in our judgment, is the planning law with the greatest direct impact on the military mission. DoD should perform a systematic review of its role in preserving endangered species and ecosystems, define the effects of the ESA on its mission, and consider how it can fulfill its obligations in system-wide ways that balance the military and environmental mission. Such an effort should be the first step in participating in the ongoing debate to set and implement national land-use and conservation policies.

7. STRATEGY FOR THE FUTURE

Planning and land-use laws, including the ESA, already affect military training at many other installations. Fort Bragg's new approach in RCW conservation, stimulated by sustained high-level command involvement, gives hope that even difficult conflicts can be resolved with sufficient will and resources. But the ability to optimize training while protecting the environment would be better served if a systematic Army-wide approach were adopted. Although installations may vary in detail, we believe that the lessons of Fort Bragg can be generalized to form the foundation for a broad proactive Army strategy that includes:

- Recognition that the planning laws are as comprehensive as rule-based laws and require an authoritative response from the command structure;
- Integrated long-range environmental and military mission planning (to minimize impacts on training and combat readiness) performed by teams with expertise in wildlife biology, law, base operations, and military training;
- De-emphasis of land-management policies that stress revenue generation at the expense of ecosystem conservation, because such policies introduce incentives that can damage both military and environmental missions;
- Developing alternatives to the present base management approach (characterized by local autonomy, "stovepiping," and rapid staff turnover) to one better suited to resolving multi-dimensional long-term conservation issues whose scope may be regional or even national;
- Committing DA to establishing a system (comparable to one that exists for environmental restoration and compliance) for institutional learning, data gathering, and assisting installations to resolve training and land-management issues;
- Using Base Realignment and Closure to adjust the basing structure of the Army to better match military missions to ecological conditions and capacity of training lands.

Additionally, we recommend that DoD begin to participate responsibly in the nation's environmental and conservation debate by documenting how environmental constraints affect its mission and by

suggesting ways to more effectively balance its national security and environmental priorities.

Finally, we emphasize that the difficult goals of conducting effective training and exercising sound resource stewardship are compatible and that the Army, because it is the principal stakeholder for these twin goals, should be the lead DoD agency in developing strategies and systems to reconcile them before new crises emerge.